EXHIBIT 8
File History of U.S. Patent No. 8,103,213

Docket No. 4208-4448

Express Mail No.

27123
↑CUSTOMER NUMBER↑

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
UTILITY APPLICATION AND FEE TRANSMITTAL §(1.53(B))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s) names and addresses:

(1) Pertti Tolonen
Aatelikuja 1A, 01520 Vantaa FINLAND

☐ Additional inventors are listed on a separate sheet

For: SOFTWARE-DEFINED RADIO CONFIGURATION

Enclosed Are:

☒ Application

33 page(s) of specification
1 page(s) of Abstract
8 page(s) of claims
23 sheets of ☒ Formal ☐ Informal drawings

☐ Declaration and Power of Attorney

- ☐ Unsigned
- ☐ Newly Executed
- ☐ Copy from prior application
- ☐ Deletion of inventors including Signed Statement under 37 C.F.R. §1.63(d)(2)

☐ REQUEST AND CERTIFICATION UNDER 35 U.S.C. §122(b)(2)(B)(i) (form PTO/SB/35)
As indicated on the attached Request and Certification, Applicant(s) certify that the invention disclosed in the attached application HAS NOT and WILL NOT be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing. Applicant(s) therefore request(s) that the attached application NOT be published under 35 U.S.C. §122(b).

☐ Incorporation by Reference:
- ☐ The entire disclosure of the prior application, from which a copy of the combined Declaration and Power of Attorney is supplied herein, is considered as being part of the disclosure of the accompanying application and is incorporated herein by reference.

☐ Deletion of Inventors (37 C.F.R. §1.63(d) and §1.33(b)

Signed statement attached deleting inventor(s) named in the prior application serial no. _____, filed _____.

☐ Microfiche Computer Program (Appendix)

- ☐ page(s) of Sequence Listing

- ☐ computer readable disk containing Sequence Listing
- ☐ Statement under 37 C.F.R. §1.821(f) that computer and paper copies of the Sequence Listing are the same

☐ Assignment Papers (assignment cover sheet and assignment documents)

- ☐ A check in the amount of $40.00 for recording the Assignment
- ☐ Charge the Assignment Recordation Fee to Deposit Account No. **13-4500**, Order No. _____.
- ☐ Assignment Papers filed in the parent application Serial No. _____

☐ Certification of chain of title pursuant to 37 C.F.R. §3.73(b)

☐ Priority is claimed under 35 U.S.C. §119 for:
Application No(s). _____ , filed _____, in _____ (country).

- ☐ Certified Copy of Priority Document(s) [_____]
  - ☐ filed herewith
  - ☐ filed in application Serial No. _____, filed _____.
- ☐ English translation document(s) [_____]
  - ☐ filed herewith
  - ☐ filed in application Serial No. _____, filed _____.

☐ Priority is claimed under 35 U.S.C. §119(e) for:
Provisional Application No. _____, filed _____.

☐ Information Disclosure Statement

- ☐ Copy of [_____] cited references
- ☐ PTO Form-1449
- ☐ References cited in parent application Serial No. _____, filed _____.

☐ Related Case Statement under 37 C.F.R. §1.98(a)(2)(iii)

- ☐ A copy of related pending U.S. Application(s) Serial No(s): _____, filed _____, respectively, is attached hereto.
- ☐ A copy of related pending U.S. Application(s) entitled, _____, filed _____ to inventor(s) _____, respectively, is attached hereto.
- ☐ A copy of each related application(s) was submitted in parent application serial no. _____, filed _____.

☐ Preliminary Amendment

☐ Return receipt postcard (MPEP 503)

Docket No. 4208-4448
Express Mail No.

☐ This is a ☐ continuation ☐ divisional ☐ continuation-in-part of prior application serial no. _____, filed _____, to which priority under 35 U.S.C. §120 is claimed.

☐ Cancel in this application original claims _____ of the parent application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)

☐ A Preliminary Amendment is enclosed. (Claims added by this Amendment have been properly numbered consecutively beginning with the number following the highest numbered original claim in the prior application).

☐ The status of the parent application is as follows:

☐ A Petition for Extension of Time and a Fee therefor has been or is being filed in the parent application to extend the term for action in the parent application until _____.

☐ A copy of the Petition for Extension of Time in the co-pending parent application is attached.

☐ No Petition for Extension of Time and Fee are necessary in the co-pending parent application.

☐ Please abandon the parent application at a time while the parent application is pending or at a time when the petition for extension of time in that application is granted and while this application is pending has been granted a filing date, so as to make this application co-pending.

☐ Transfer the drawing(s) from the parent application to this application

☐ Amend the specification by inserting before the first line the sentence:
This is ☐ continuation ☐ divisional ☐ continuation-in-part of co-pending application Serial No. _____, filed _____.

I. CALCULATION OF APPLICATION FEE				
Basic Fee ($310/$155)				$ 310.00
Examination Fee ($210/$105)				$ 210.00
Search Fee ($510/$255)				$ 510.00
	Number Filed	Number Extra	Rate	
Total Claims	29 - 20 =	9 x	($50/$25)	$ 450.00
Independent Claims	8 - 3 =	0 x	($210/$105)	$ 1050.00
☐ Multiple Dependent Claims	If marked, add fee of $370/$185			$ 0.00
Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee	
65- 100 =	0/ 50 =	(round up to the whole number)	($260/$130)	$ 0.00
			TOTAL:	$ 2,530.00

☐ Small entity status is or has been claimed. Reduced fees under 37 C.F.R. §1.9 (f) paid herewith $_____.

☒ Charge fee to Deposit Account No. **13-4500**, Order No. 4208-4448. A DUPLICATE COPY OF THIS SHEET IS ATTACHED.

Docket No. 4208-4448
Express Mail No.

☒ The Commissioner is hereby authorized to charge any additional fees which may be required for filing this application pursuant to 37 CFR §1.16, **including all extension of time fees pursuant to 37 C.F.R. § 1.17 for maintaining copendency** with the parent application, or credit any overpayment to Deposit Account No. **13-4500**, Order No. 4208-4448. A DUPLICATE COPY OF THIS SHEET IS ATTACHED.

Respectfully submitted,

MORGAN & FINNEGAN, L.L.P.

Dated: September 3, 2008

Elliot L. Frank
Registration No. 56,641

Correspondence Address:
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Docket No. 4208-4448

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Docket No. 4208-4448
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Respectfully submitted,

MORGAN & FINNEGAN, L.L.P.

Dated: September 3, 2008

Elliot L. Frank
Registration No. 56,641

Correspondence Address:
Address Associated With Customer Number:
27123

(212) 415-8700 Telephone
(212) 415-8701 Facsimile

PTO/SB/14 (07-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4208-4448
	Application Number	
Title of Invention	SOFTWARE-DEFINED RADIO CONFIGURATION	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Pertti		TOLONEN	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Vantaa	State/Province		Country of Residence i	FI

Citizenship under 37 CFR 1.41(b) i FI

Mailing Address of Applicant:

Address 1	Aatelikuja 1A		
Address 2			
City	Vantaa	State/Province	
Postal Code	01520	Country i	FI

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	27123		
Email Address	PTPatentCommunications@MorganFinnegan.com	Add Email	Remove Email

Application Information:

Title of the Invention	SOFTWARE-DEFINED RADIO CONFIGURATION		
Attorney Docket Number	4208-4448	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	23	Suggested Figure for Publication (if any)	

PTO/SB/14 (07-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4208-4448
	Application Number	
Title of Invention	SOFTWARE-DEFINED RADIO CONFIGURATION	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	27123		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			◉ Yes ○ No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1 Remove

PTO/SB/14 (07-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4208-4448
	Application Number	
Title of Invention	SOFTWARE-DEFINED RADIO CONFIGURATION	

If the Assignee is an Organization check here. ☒			
Organization Name	NOKIA CORPORATION		
Mailing Address Information:			
Address 1	Keilalahdentie 4		
Address 2			
City	Espoo	**State/Province**	
Country [i]	FI	Postal Code	FIN-02150
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the **Add** button.		Add	

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
Signature	/Elliot L. Frank/			Date (YYYY-MM-DD)	2008-09-03
First Name	Elliot	Last Name	Frank	Registration Number	56641

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

SOFTWARE-DEFINED RADIO CONFIGURATION

Inventor: Pertti TOLONEN

BACKGROUND

1. Field of Invention:

[0001] The present invention relates to wireless communication, and more specifically, to a system for facilitating wireless communication connections between configurable radio devices.

2. Background:

[0002] Wireless apparatuses continue to proliferate in the global marketplace due to technological improvement in both the quality of communication and device functionality. These wireless communication devices (WCDs) have become common for both personal and business use, allowing users to transmit and receive voice, text and graphical data from a multitude of geographic locations. Communication networks usable by these devices may span different frequencies and transmission distances.

[0003] For example, cellular networks may facilitate WCD communication over large geographic areas. These technologies are commonly divided by generation, starting in the 1970s-1980s with first generation (1G) analog cellular telephones that provided baseline voice communication, to modern digital handsets. GSM is an example of a widely employed 2G digital cellular network communicating in the 900 MHZ/1.8 GHZ bands in Europe and at 850 MHz and 1.9 GHZ in the United States. GSM provides voice communication and supports text transmission via the Short Messaging Service (SMS). SMS may transmit and receive text messages of up to 160 characters, while providing data transfer to packet networks, ISDN and POTS users at 9.6 Kbps, while Multimedia Messaging Service (MMS) allows for the transmission of sound, graphics and video files in addition to simple text. Emerging technologies such as Digital Video Broadcasting for Handheld Devices (DVB-H) will make streaming digital video, and other similar content, available for direct transmission to a WCD. While long-range communication networks are a well-accepted means for transmitting and

receiving data, due to cost, traffic and legislative concerns, these networks may not be appropriate for all data applications.

[0004] Short-range wireless networks may provide communication solutions that avoid some of the problems seen in large cellular networks. Bluetooth™ is an example of a short-range wireless technology quickly gaining acceptance in the marketplace. A 1 Mbps Bluetooth™ radio may transmit and receives data at a rate of 720 Kbps within a range of 10 meters, and may transmit up to 100 meters with additional power boosting. Enhanced data rate (EDR) technology also available may enable maximum asymmetric data rates of 1448 Kbps for a 2 Mbps connection and 2178 Kbps for a 3 Mbps connection. A plurality of devices within operating range of each other may automatically form a network group called a "piconet". Any apparatus may promote itself to the master of the piconet, allowing it to control data exchanges with up to seven "active" slaves and 255 "parked" slaves. Active slaves may exchange data based on the clock timing of the master, while parked slaves monitor a beacon signal in order to stay synchronized with the master. These apparatuses may continually switch between active communication and power saving modes in order to transmit data to other piconet members. In addition to Bluetooth™ other popular short-range wireless networks include WLAN (of which "Wi-Fi" local access points communicating in accordance with the IEEE 802.11 standard, is an example), WUSB, UWB, ZigBee (802.15.4, 802.15.4a), and UHF RFID.

[0005] Manufacturers may also incorporate resources for providing enhanced functionality in WCDs (e.g., components and/or software for performing close-proximity wireless communication). Sensors, scanners, etc. may be utilized to read visual or electronic information into an apparatus. In an example transaction, users may hold their WCD in proximity to a target, aiming their WCD at an object (e.g., to take a picture) or sweeping the device over a printed tag or document to obtain information. These technologies include machine-readable mediums such as radio frequency identification (RFID), Infra-red (IR) communication, optical character recognition (OCR) and various other types of visual, electronic and magnetic scanning that may be utilized to quickly input desired information into the WCD without the need for manual entry by a user.

[0006] These examples of additional communication functionality may be implemented in apparatuses utilizing various combinations of hardware and/or software. For instance, one or

more functions that were previously handled by discrete components (e.g., hardware-based wireless radios) may be handled by more generic software-driven processes. Moreover, the ability to reconfigure software-based modules during runtime may, in some instances, allow a software-based solution to emulate the functionality of multiple traditional hardware modules. The ability to implement flexible configuration may allow one or more hardware components to be omitted from an apparatus in favor of a software-based solution that is configurable to perform the same or similar function, while being more efficient in terms of power, space, etc.

[0004] However, problems can also spawn from the ability to reconfigure software-based modules during runtime. The runtime flexibility of software-driven solutions, while beneficial, can also increase the potential for negatively impacting (e.g., interfering with) other processes also occurring on the executing apparatus, on another apparatus with which communication is desired, etc. Further, software-based solutions must be able to interact with older discrete implementations by accounting for the limitations inherent in these hardware-based solutions.

SUMMARY

[0005] Various embodiments of the present invention are directed to at least a method, computer program product, apparatus and system for configuring communication resources that are at least partially based upon reconfigurable software modules. For example, an apparatus may utilize a plurality of transports for communication, wherein the transports are supported by one or more radio modules. The one or more radio modules may comprise hardware-based radio modules and software-defined radio (SDR) modules including a reconfigurable software element that allows the radio module to emulate the functionality of multiple hardware-based radios. In accordance with at least one embodiment of the present invention, SDR modules in an apparatus may formulate a communication configuration for use in communicating with another apparatus based on remote characteristic information (e.g., information corresponding to the apparatus with which communication is desired) and local characteristic information pertaining to the apparatus.

[0006] In an example implementation, an apparatus may desire to communicate with another apparatus. In order to configuration, the apparatus may first make an inquiry to the other device utilizing a initialization channel. Initialization channels may be, for example, predefined

channels in a wireless transport that are reserved for communication establishment. The inquiry, if successfully received in the other apparatus, may prompt a response message to the inquiring apparatus, the response message including at least remote characteristic information.

[0007] Remote characteristic information may include, for example, information related to the abilities and/or status of the other apparatus, and may further incorporate environmental information concerning possible interference known to (e.g., in the case other transports that are currently being utilized), or sensed by, the other apparatus. A determination may also be made with respect to local characteristic information, wherein local characteristic information may be similar to the remote characteristic information but pertaining instead to the initiating apparatus.

[0008] The initiating apparatus may then formulate a configuration based at least upon the received remote characteristic information and the local characteristic information. In at least one embodiment of the present invention, the configuration may comprise information usable by resources in one or both of the initiating apparatus and the other apparatus for establishing a link between the apparatuses. The configuration may then be sent from the initiating apparatus to the other apparatus (e.g., via the initialization channel), wherein the configuration may be utilized for resource configuration. Similarly, the configuration information already residing on the initiating apparatus may also be utilized for configuring resources. The resulting resource configuration in each apparatus allows for the establishment of communication between the apparatuses, wherein the communication takes into account the condition of each apparatus.

[0009] The foregoing summary includes example embodiments of the present invention that are not intended to be limiting. The above embodiments are used merely to explain selected aspects or steps that may be utilized in implementations of the present invention. However, it is readily apparent that one or more aspects, or steps, pertaining to an example embodiment can be combined with one or more aspects, or steps, of other embodiments to create new embodiments still within the scope of the present invention. Therefore, persons of ordinary skill in the art would appreciate that various embodiments of the present invention may incorporate aspects from other embodiments, or may be implemented in combination with other embodiments.

DESCRIPTION OF DRAWINGS

[0010] Various embodiments of the present invention may be understood in view of the following configuration examples taken in conjunction with the drawings, wherein:

[0011] FIG. 1 discloses an example of a wireless operational environment, including wireless transports having different effective ranges.

[0012] FIG. 2 discloses a modular example of a wireless communication device that may be usable in accordance with at least one embodiment of the present invention.

[0013] FIG. 3 discloses a structural representation of the example previously described with respect to FIG. 2.

[0014] FIG. 4 discloses an operational example of communication utilizing a wireless transport in accordance with at least one embodiment of the present invention.

[0015] FIG. 5 discloses an operational example wherein interference may occur during the concurrent operation of multiple radio modems within the same apparatus.

[0016] FIG. 6A discloses a structural example of a wireless communication device including a multiradio controller in accordance with at least one embodiment of the present invention.

[0017] FIG. 6B discloses a more detailed structural representation of FIG. 6A including the multiradio controller and the radio modems.

[0018] FIG. 6C discloses an operational example of a wireless communication device including a multiradio controller in accordance with at least one embodiment of the present invention.

[0019] FIG. 7A discloses a structural example of a wireless communication device including a multiradio control system in accordance with at least one embodiment of the present invention.

[0020] FIG. 7B discloses a more detailed structural representation of FIG. 7A including the multiradio control system and the radio modems.

[0021] FIG. 7C discloses an operational example of a wireless communication device including a multiradio control system in accordance with at least one embodiment of the present invention.

[0022] FIG. 8A discloses a structural example of a wireless communication device including a distributed multiradio control system in accordance with at least one embodiment of the present invention.

[0023] FIG. 8B discloses a more detailed structural representation of FIG. 8A including the distributed multiradio control system and the radio modems.

[0024] FIG. 8C discloses an operational example of a wireless communication device including a distributed multiradio control system in accordance with at least one embodiment of the present invention.

[0025] FIG. 9A discloses a structural example of a wireless communication device including a distributed multiradio control system in accordance with an alternative embodiment of the present invention.

[0026] FIG. 9B discloses a more detailed structural representation of FIG. 9A including the distributed multiradio control system and the radio modems.

[0027] FIG. 9C discloses an operational example of a wireless communication device including a distributed multiradio control system in accordance with the alternative embodiment of the present invention disclosed in FIG. 9A.

[0028] FIG. 10 discloses an example of an information packet usable with at least one embodiment of the present invention.

[0029] FIG. 11 discloses an example of a software-defined radio module usable in implementing various embodiments of the present invention.

[0030] FIG. 12 discloses an example modular representation of the software-defined radio module disclosed in FIG. 11.

[0031] FIG. 13 discloses an operational example in accordance with at least one embodiment of the present invention.

[0032] FIG. 14A discloses a flowchart for an example configuration process from the initiator side in accordance with at least one embodiment of the present invention.

[0033] FIG. 14B discloses a flowchart for an example configuration process from the receiving side in accordance with at least one embodiment of the present invention.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0034] While the present invention has been described herein in terms of a variety of embodiment examples, changes can be made therein without departing from the spirit and scope of the invention, as set forth in the appended claims.

I. Wireless communication over different communication networks

[0035] Wireless communication devices may transmit and receive information over a wide array of wireless communication networks, each with different advantages regarding speed, range, quality (error correction), security (encoding), etc. These characteristics may dictate, for example, the amount of information that can be transferred to a receiving apparatus, and the duration of the information transfer. FIG. 1 includes an example of a WCD and how it may interact with various types of wireless networks.

[0036] In FIG. 1, user 110 possesses WCD 100. The apparatus shown is a high functionality portable device, however, usable apparatuses span a range from basic cellular handsets to more wirelessly enabled palmtop or laptop computers. Close-proximity communication 130 may include close proximity inter-apparatus communication or transponder-type interactions wherein only the scanning device may require a power source. In example transponder interaction, WCD 100 may scan source 120 via short-range communication. A transponder in source 120 may use the energy and/or clock signal contained within the scanning signal, as in the case of RFID communication, to respond with data stored in the transponder. Machine readable technologies may have an effective transmission range on the order of ten feet, and may be able to deliver stored data in amounts from a bit to over a megabit (or 125 Kbytes) relatively quickly. These characteristics make such technologies well suited for identification

purposes, such as in receiving an account number for a public transportation provider, a key code for an automatic electronic door lock, an account number for a credit or debit transaction, etc.

[0037] The transmission range between two apparatuses may be extended if both device can participate in powered communication using more robust wireless transports. Short-range active communication 140 may include applications wherein the sending and receiving devices are both active. An example situation would include user 110 coming within effective transmission range of a Bluetooth™, WLAN, UWB, WUSB, etc. access point. In the case of Bluetooth™, a network may automatically be established to transmit information to WCD 100 possessed by user 110. The amount of information that can be conveyed is unlimited, except that it must all be transferred in the time when user 110 is within effective transmission range of the access point. The higher complexity attributed to these wireless transports means that additional time may be required when establishing an initial connection to WCD 100, which may be increased if a large number of devices are queued for service in the area proximate to the access point. The transmission range of these transports may vary depending on the technology and may, for example, extend from 30 ft. to over 300 ft. with additional power boosting.

[0038] Long-range networks 150 may be used to provide virtually uninterrupted communication coverage for WCD 100. Land-based radio stations or satellites may be used to relay various communication transactions worldwide. While these systems are extremely functional, the use of these systems is often charged on a per-minute basis to user 110, not including additional charges for data transfer (e.g., wireless Internet access). Further, the regulations covering these systems may cause additional overhead for both the users and providers, making the use of these systems more cumbersome.

II. Wireless communication device

[0039] As previously described, various embodiments of the present invention may be implemented using a variety of wireless communication equipment. Therefore, it is important to understand the communication tools available to user 110 before exploring the present invention. For example, in the case of a cellular telephone or other handheld wireless devices, the integrated data handling capabilities of the device play an important role in facilitating transactions between the transmitting and receiving devices.

[0040] FIG. 2 discloses an example of a modular layout for an apparatus usable with the present invention. WCD 100 is broken down into modules representing the functional aspects of the device. These functions may be performed by the various combinations of software and/or hardware components discussed below.

[0041] Control module 210 may regulate the operation of the apparatus. Inputs may be received from various other modules included within WCD 100. For example, interference sensing module 220 may use various techniques to detect any sources of environmental interference within transmission range of the apparatus. Control module 210 may interpret this data, and in response, may control other modules in WCD 100.

[0042] Communications module 230 may incorporate all of the communication aspects of WCD 100. As shown in FIG. 2, communications module 230 may include, for example, long-range communications module 232, short-range communications module 234 and close-proximity module 236. Communications module 230 may utilize one or more of these sub-modules to receive a multitude of different types of communication from both local and long distance sources, and to transmit data to recipient devices within the transmission range of WCD 100. Communications module 230 may be triggered by control module 210, or by control resources local to the module responding to sensed messages, environmental influences and/or other devices in proximity to WCD 100.

[0043] User interface module 240 may comprise visual, audible and tactile components (e.g., hardware and/or software) that allow user 110 to receive data from, and enter data into, the device. For instance, data entered by user 110 may be interpreted by control module 210 to affect the behavior of WCD 100. User-inputted data may also be transmitted by communications module 230 to other devices within effective transmission range. Other devices in transmission range may also send information to WCD 100 via communications module 230, and control module 210 may cause this information to be transferred to user interface module 240 for presentment to the user.

[0044] Applications module 250 may comprise other hardware and/or software applications on WCD 100. These applications may include sensors, interfaces, utilities, interpreters, data applications, etc., and may be invoked by control module 210 to read

information provided by the various modules, and in turn, may supply information to requesting modules in WCD 100.

[0045] In accordance with at least one embodiment of the present invention, FIG. 3 discloses an example of a structural layout usable in implementing the functionality of the modular system previously described with respect to FIG. 2. Processor 300 may control overall device operation. As shown in FIG. 3, processor 300 may be coupled to one or more communications sections 310, 320 and 340. Processor 300 may further be implemented utilizing one or more microprocessors that are each capable of executing software instructions stored in memory 330.

[0046] Memory 330 may include various types of random access memory (RAM), read only memory (ROM). Examples of usable memory types may include, for example, fixed computer readable media such electronic components and/or modules in stalled in the apparatus. Further, removable computer-readable medium on which computer executable code is embodied or recorded may be considered part of memory 330. Removable media may include electronic (e.g., Flash), magnetic (e.g., removable disks, drives, etc.), optical (e.g., CD-ROM, DVD, etc.) media, or any other technology that may be configured to store information in the form of data and software components (also referred to as modules). Data stored by memory 330 may be associated with particular software components. In addition, this data may be associated with databases, such as a bookmark database or a business database for scheduling, email, etc.

[0047] The software components stored by memory 330 include instructions that can be executed by processor 300. Various types of software components may be stored in memory 330. For instance, memory 330 may store software components that control the overall operation of WCD 100 (e.g., in the form of an operating system) and may also include more specialized software modules configured to manage particular functions such as communication sections 310, 320 and 340. Application-related software modules may also be stored in Memory 330. Examples of these software components may include a firewall, a service guide manager, a bookmark database, user interface manager, user-installed applications and communication utilities modules required to support WCD 100.

[0048] Long-range communications 310 may manage functionality related to the wireless exchange of information over large geographic areas (such as cellular networks) via an antenna. Communication transactions may be conducted using technologies from the previously described 1G to 3G. In addition to basic voice communication (e.g., via GSM), long-range communications 310 may operate to establish data communication sessions, such as General Packet Radio Service (GPRS) sessions and/or Universal Mobile Telecommunications System (UMTS) sessions. Also, long-range communications 310 may operate to transmit and receive messages, such as short messaging service (SMS) messages and/or multimedia messaging service (MMS) messages.

[0049] As a subset of long-range communications 310, or alternatively operating as an independent module separately connected to processor 300, transmission receiver 312 may allow WCD 100 to receive transmission messages via mediums such as Digital Video Broadcast for Handheld Devices (DVB-H). In at least one example scenario, transmissions may be encoded so that only certain receiving devices may access the transmission content, and may contain text, audio or video information. Further, WCD 100 may receive these transmissions and use information contained within the transmission signal to determine if the device is permitted to view the received content.

[0050] Short-range communications 320 is responsible for functions involving the exchange of information across short-range wireless networks. As described above and in FIG. 3, examples of wireless transports that may be categorized under short-range communications 320 are not limited to Bluetooth™, WLAN, UWB Ultra-Low Power Bluetooth™ (ULP-BT), wireless USB, Zigbee and Ultra High Frequency Radio Frequency communication (UHF RFID). Accordingly, short-range communications 320 performs functions related to the establishment of short-range connections, as well as processing related to the transmission and reception of information via such connections.

[0051] Close-proximity communications 340 may provide functionality related to the short-range scanning of machine-readable data. Near Field Communication, or NFC, apparatuses may be included in this category. For example, processor 300 may control components in close-proximity communication 340 to generate RF signals for activating an RFID transponder, and may in turn control the reception of signals from an RFID transponder.

Other short-range scanning methods for reading machine-readable data that may be supported by the close-proximity 340 are not limited to IR communication, linear and 2-D (e.g., QR) bar code readers (including processes related to interpreting UPC labels), and optical character recognition devices for reading magnetic, UV, conductive or other types of coded data that may be provided in a tag using suitable ink. To support the scanning of machine-readable data by close-proximity communications 340, WCD 100 may, for example, incorporate components such as optical detectors, magnetic detectors, CCDs or other sensors known in the art for interpreting machine-readable information.

[0052] As further shown in FIG. 3, user interface 350 may also be coupled to processor 300. User interface 350 facilitates the exchange of information with a user. The example of FIG. 3 discloses a user interface 350 that includes a user input 360 and a user output 370. User input 360 may include one or more components that allow user 110 to input information. Examples of such components include keypads, touch screens, and microphones. User output 370 allows a user to receive information from the device. Thus, user output portion 370 may include various components, such as a display, light emitting diodes (LED), tactile emitters and one or more audio speakers. Example displays include liquid crystal displays (LCDs), and other video displays.

[0053] WCD 100 may further include one or more transponders 380. A transponder may essentially comprise a passive device that may be programmed by processor 300 with information to be delivered in response to a scan from an outside source. For example, an RFID scanner mounted in an entryway may continuously emit radio frequency waves. When a person with a device containing transponder 380 walks through the door, the transponder may be energized, causing it to respond with information identifying the device, the person, etc. In addition, scanners can be mounted (e.g., as previously discussed with regard to examples of close-proximity communications 340) in WCD 100 so that it can read information from other transponders in the vicinity.

[0054] Hardware corresponding to communications sections 310, 312, 320 and 340 provide for the transmission and reception of signals. Accordingly, these portions may include components (e.g., electronics) that perform functions, such as modulation, demodulation, amplification, and filtering. These portions may be locally controlled, or controlled by processor

300 in accordance with software communication components stored in memory 330. The elements of FIG. 3 may further be constituted and/or coupled in accordance with various techniques in order to produce the functionality described in FIG. 2. In one example configuration, processor 300, communications sections 310, 312 and 320, memory 330, close-proximity communications 340, user interface 350, transponder 380, etc. may comprise separate components that are coupled together via one or more wired and/or wireless bus interfaces. Alternatively, any or all individual components may be replaced by integrated circuits in the form of a programmable logic device, gate array, ASIC, multi-chip module, etc. that may be programmed to replicate the functions of the stand-alone devices. In addition, each of these components may be coupled to a power source, such as a removable and/or rechargeable battery (not shown).

[0055] User interface 350 may allow user 110 to interact with various software components installed on the apparatus (e.g., contained in memory 330). The software components may, for example, provide functionality such as operating system modules, applications for productivity, entertainment, etc., communication utilities for supporting long-range communications 310, short-range communications 320, close-proximity communications 340, etc. Software components may include routines that, for example, may be configured to provide data processing, routing, transmission, reception, etc. Various programming mediums/languages may be used (Wireless Application (WAP), Hypertext Markup Language (HTML) variants like Compact HTML (CHTML), etc.)

III. Example operation of a wireless communication device including potential interference problems encountered.

[0056] FIG. 4 discloses an example of a process stack, in accordance with at least one embodiment of the present invention, for use in explaining operation of an apparatus. At the top level 400, user 110 interacts with WCD 100. This example involves user 110 entering information via user input 360 and receiving information from user output 370 in order to activate functionality in application level 410. In the application level, programs related to specific functionality within the device interact with both the user and the system level. These programs include applications for visual information (e.g., web browser, DVB-H receiver, etc.), audio information (e.g., cellular telephone, voice mail, conferencing software, DAB or analog

radio receiver, etc.), recording information (e.g., digital photography software, word processing, scheduling, etc.) or other information processing. Actions initiated in application level 410 may require information to be sent from, or received into, WCD 100. In FIG. 4, the transmission of data to a recipient apparatus via Bluetooth™ is being requested. As a result, application level 410 may then call resources in the system level to initiate the required processing and routing of data.

[0057] System level 420 may process and route data requests for transmission. Processing may include, for example, the calculation, translation, conversion and/or packetizing the data. The data may then be routed to an appropriate communication resource in the service level. If the desired communication resource is active and available in the service level 430, the packets may be routed to a radio modem for delivery via wireless transmission. In some configurations radio modems may comprise support hardware and/or software in addition to the actual modem component, and therefore, radio modems may interchangeably be referred to as radio modules herein. Apparatuses usable in implementing various embodiments of the present invention may include a plurality of these radio modules that are configured to operate using different wireless mediums. In FIG. 4, "modem 4" may be activated and able to send packets using Bluetooth™ communication. However, a radio module (as a hardware resource) need not be dedicated to a specific wireless medium, and may be used for different types of communication depending on the requirements of the wireless transport and the hardware characteristics of the radio modem or module.

[0058] FIG. 5 discloses a situation wherein the above described example operational process may cause more than one radio modem to become active. In this example, WCD 100 may both transmit and receive information via a multitude of transports in order to interact with various secondary devices such as those grouped at 500. For example, secondary devices may include cellular handsets communicating via long-range wireless communication like GSM, wireless headsets communicating via Bluetooth™, Internet access points communicating via WLAN, etc.

[0059] Problems may occur when some or all of these communications occur simultaneously. As further shown in FIG. 5, multiple modems operating simultaneously may cause interference for each other. Such a situation may be encountered when WCD 100 is

communicating with more than one external device (as previously described). In an extreme example, devices simultaneously communicating via Bluetooth™, WLAN and wireless USB would encounter substantial overlap since all of these wireless transports operate in the 2.4 GHz band. The interference, shown as an overlapping portion of the fields depicted in FIG. 5, would cause packets to be lost and the need for retransmission of these lost packets. Retransmission requires that future time slots be used to retransmit lost information, and therefore, overall communication performance will at least be reduced, if the signal is not lost completely. The present invention, in accordance with at least one embodiment, seeks to manage problematic situations where possibly conflicting communications may occur simultaneously so that interference is minimized or avoided, resulting in increased speed and Quality of Service (QoS).

IV. A wireless communication device including a multiradio controller.

[0060] In an attempt to better manage communication in WCD 100, a controller dedicated to managing wireless communication may be introduced. WCD 100, as shown in FIG. 6A, includes a multiradio controller (MRC) 600 in accordance with at least one embodiment of the present invention. MRC 600 may be coupled to the master control system of WCD 100, enabling MRC 600 to communicate with radio modems or other similar devices in communications modules 310 312, 320 and 340 within WCD 100.

[0061] FIG. 6B discloses in detail at least one embodiment of WCD 100, which may include multiradio controller (MRC) 600 introduced in FIG. 6A in accordance with at least one embodiment of the present invention. MRC 600 includes common interface 620 by which information may be sent or received through master control system 640. As set forth above, radio modems 610 and other devices 630 may also be referred to as "modules" in this disclosure as they may contain supporting hardware and/or software resources in addition to the modem itself. These resources may include control, interface and/or processing resources. Radio modems 610 or similar communication devices 630 (e.g., an RFID scanner for scanning machine-readable information) may include some sort of common interface 620 for communicating with master control system 640. As a result, all information, commands, etc. occurring between radio modems 610, similar devices 630 and MRC 600 are conveyed by the communication resources of master control system 640. The possible effect of sharing

communication resources with all the other functional modules within WCD 100 will be discussed with respect to FIG. 6C.

[0062] FIG. 6C discloses an operational diagram similar to FIG. 4 including the effect of MRC 600 in accordance with at least one embodiment of the present invention. In this system MRC 600 may receive operational data from the master operating system of WCD 100, concerning for example applications running in application level 410, and status data from the various radio communication devices in service level 430. MRC 600 may use this information to issue scheduling commands to the communication devices in service level 430 in an attempt to avoid communication problems. However, problems may occur when the operations of WCD 100 are fully employed. Since the various applications in application level 410, the operating system in system level 420, the communication devices in service level 430 and MRC 600 must all share the same communication system, delays may occur when all aspects of WCD 100 are trying to communicate on the common interface system 620. As a result, delay sensitive information regarding both communication resource status information and radio modem 610 control information may become delayed, nullifying any beneficial effect from MRC 600. Therefore, a system better able to handle the differentiation and routing of delay sensitive information is required if the beneficial effect of MRC 600 is to be realized.

V. A wireless communication device including a multiradio control system.

[0063] In accordance with at least one embodiment of the present invention, FIG. 7A introduces MRC 600 as part of multiradio control system (MCS) 700. MCS 700 may directly link communication resources in modules 310, 312, 320 and 340 to MRC 600. In this way, MCS 700 may be configured to provide a dedicated low-traffic communication structure for carrying delay sensitive information both to and from MRC 600.

[0064] Additional detail is shown in FIG. 7B. MCS 700 forms a direct link between MRC 600 and the communication resources of WCD 100. This link may be established by a system of dedicated MCS interfaces 710 and 760. For example, MCS interface 760 may be coupled to MRC 600. MCS Interfaces 710 may connect radio modems 610 and other similar communication devices 630 to MCS 700 in order to form an information conveyance for allowing delay sensitive information to travel to and from MRC 600. Therefore, MRC 600

operation may no longer be influenced by the processing load of master control system 640. As a result, any information still communicated by master control system 640 to and from MRC 600 may be deemed delay tolerant, and therefore, the actual arrival time of this information does not substantially influence system performance. On the other hand, all delay sensitive information is directed to MCS 700, and therefore is insulated from the loading of the master control system.

[0065] The effect of MCS 700 is seen in FIG. 7C in accordance with at least one embodiment of the present invention. Information may now be received in MRC 600 from at least two sources. System level 420 may continue to provide information to MRC 600 through master control system 640. In addition, service level 430 may specifically provide delay sensitive information conveyed by MCS 700. MRC 600 may distinguish between these two classes of information and act accordingly. Delay tolerant information may include information that typically does not change when a radio modem is actively engaged in communication, such as radio mode information (e.g., GPRS, Bluetooth™, WLAN, etc.), priority information that may be defined by user settings, the specific service the radio is driving (QoS, real time/non real time), etc. Since delay tolerant information changes infrequently, it may be delivered in due course by master control system 640 of WCD 100. Alternatively, delay sensitive (or time sensitive) information includes at least modem operational information that frequently changes during the course of a wireless connection, and therefore, requires immediate update. As a result, delay sensitive information may need to be delivered directly from the plurality of radio modems 610 through the MCS interfaces 710 and 760 to MRC 600, and may include radio modem synchronization information. Delay sensitive information may be provided in response to requests by MRC 600, or may be delivered as a result of a change in radio modem settings during transmission as discussed below with respect to synchronization.

VI. A wireless communication device including a distributed multiradio control system.

[0066] FIG. 8A discloses an alternative configuration in accordance with at least one embodiment of the present invention, wherein a distributed multiradio control system (MCS) 700 is introduced into WCD 100. Distributed MCS 700 may, in some cases, be deemed to provide an advantage over a centralized MRC 600 by distributing these control features into already necessary components within WCD 100. As a result, a substantial amount of the communication

management operations may be localized to the various communication resources, such as radio modems (modules) 610, reducing the overall amount of control command traffic in WCD 100.

[0067] MCS 700, in this example, may be implemented utilizing a variety of bus structures, including the I^2C interface commonly found in portable electronic devices, as well as emerging standards such as SLIMbus that are now under development. I^2C is a multi-master bus, wherein multiple devices can be connected to the same bus and each one can act as a master through initiating a data transfer. An I^2C bus contains at least two communication lines, an information line and a clock line. When an apparatus has data to transmit, it assumes a master role and transmits both its clock signal and information to a recipient device. On the other hand, SLIMbus uses a separate, non-differential physical layer that runs at rates of 50 Mbits/s or slower over just one lane. It is being developed by the Mobile Industry Processor Interface (MIPI) Alliance to replace today's I^2C and I^2S interfaces while offering more features and requiring the same or less power than the two combined.

[0068] MCS 700 directly links distributed control components 702 in modules 310, 312, 320 and 340. Another distributed control component 704 may reside in master control system 640 of WCD 100. It is important to note that distributed control component 704 shown in processor 300 is not limited only to the disclosed embodiment, and may reside in any appropriate system module within WCD 100. The addition of MCS 700 provides a dedicated low-traffic communication structure for carrying delay sensitive information both to and from the various distributed control components 702.

[0069] The example configuration disclosed in FIG. 8A is described further with respect to FIG. 8B. MCS 700 forms a direct link between distributed control components 702 within WCD 100. Distributed control components 702 in radio modems 610 (together forming a "module") may, for example, consist of MCS interface 710, radio activity controller 720 and synchronizer 730. Radio activity controller 720 uses MCS interface 710 to communicate with distributed control components in other radio modems 610. Synchronizer 730 may be utilized to obtain timing information from radio modem 610 to satisfy synchronization requests from any of the distributed control components 702. Radio activity controller 702 may also obtain information from master control system 640 (e.g., from distributed control component 704) through common interface 620. As a result, any information communicated by master control

system 640 to radio activity controller 720 through common interface 620 may be deemed delay tolerant, and therefore, the actual arrival time of this information does not substantially influence communication system performance. On the other hand, all delay sensitive information may be conveyed by MCS 700, and therefore is insulated from master control system overloading.

[0070] As previously stated, distributed control component 704 may exist within master control system 640. Some aspects of this component may reside in processor 300 as, for example, a running software routine that monitors and coordinates the behavior of radio activity controllers 720. Processor 300 is shown to contain priority controller 740. Priority controller 740 may be utilized to monitor active radio modems 610 in order to determine priority amongst these devices. Priority may be determined by rules and/or conditions stored in priority controller 740. Modems that become active may request priority information from priority controller 740. Further, modems that go inactive may notify priority controller 740 so that the relative priority of the remaining active radio modems 610 may be adjusted accordingly. Priority information is usually not considered delay sensitive because it is mainly updated when radio modems 610 activate/deactivate, and therefore, does not frequently change during the course of an active communication connection in radio modems 610. In various embodiments of the present invention, this information may be conveyed to radio modems 610 using common interface system 620.

[0071] At least one impact of a distributed control MCS 700 is seen in FIG. 8C. System level 420 may continue to provide delay tolerant information to distributed control components 702 through master control system 640. In addition, distributed control components 702 in service level 430, such as modem activity controllers 720, may exchange delay sensitive information with each other via MCS 700. Each distributed control component 702 may distinguish between these two classes of information and act accordingly. Delay tolerant information may include information that typically does not change when a radio modem is actively engaged in communication, such as radio mode information (e.g., GPRS, Bluetooth™, WLAN, etc.), priority information that may be defined by user settings, the specific service the radio is driving (QoS, real time/non real time), etc. Since delay tolerant information changes infrequently, it may be delivered in due course by master control system 640 of WCD 100. Alternatively, delay sensitive (or time sensitive) information may include at least modem

operational information that frequently changes during the course of a wireless connection, and therefore, requires immediate update. Delay sensitive information needs to be delivered directly between distributed control components 702, and may include radio modem synchronization and activity control information. Delay sensitive information may be provided in response to a request, or may be delivered as a result of a change in radio modem, which will be discussed with respect to synchronization below.

[0072] MCS interface 710 may be used to (1) Exchange synchronization information, and (2) Transmit identification or prioritization information between various radio activity controllers 720. In addition, as previously stated, MCS interface 710 may be utilized for communicating the radio parameters that are delay sensitive from a controlling point of view. MCS interface 710 can be shared between different radio modems (multipoint) but it cannot be shared with any other functionality that could limit the usage of MCS interface 710 from a latency point of view.

[0073] The control signals sent on MCS 700 that may enable/disable a radio modem 610 should be based upon a modem's periodic events. Each radio activity controller 720 may obtain this information about a radio modem's periodic events from synchronizer 730. This kind of event can be, for example, frame clock event in GSM (4.615 ms), slot clock event in Bluetooth™ (625 us) or targeted beacon transmission time in WLAN (100 ms) or any multiple of these. A radio modem 610 may send its synchronization indications when (1) Any radio activity controller 720 requests it, (2) a radio modem internal time reference is changed (e.g. due to handover or handoff). The latency requirement for the synchronization signal is not critical as long as the delay is constant within a few microseconds. The fixed delays can be taken into account in the scheduling logic of radio activity controller 710.

[0074] For predictive wireless communication mediums, the radio modem activity control may be based on the knowledge of when the active radio modems 610 are about to transmit (or receive) in the specific connection mode in which the radios are currently operating. The connection mode of each radio modem 610 may be mapped to the time domain operation in their respective radio activity controller 720. As an example, for a GSM speech connection, priority controller 740 may have knowledge about all traffic patterns of GSM. This information may be transferred to the appropriate radio activity controller 720 when radio modem 610

becomes active, which may then recognize that the speech connection in GSM includes one transmission slot of length 577 µs, followed by an empty slot after which is the reception slot of 577 µs, two empty slots, monitoring (RX on), two empty slots, and then it repeats. Dual transfer mode means two transmission slots, empty slot, reception slot, empty slot, monitoring and two empty slots. When all traffic patterns that are known a priori by the radio activity controller 720, it only needs to know when the transmission slot occurs in time to gain knowledge of when the GSM radio modem is active. This information may be obtained by synchronizer 730. When the active radio modem 610 is about to transmit (or receive) it must check every time whether the modem activity control signal from its respective radio activity controller 720 permits the communication. Radio activity controller 720 is always either allowing or disabling the transmission of one full radio transmission block (e.g. GSM slot).

VII. An example of an alternative distributed multiradio control system.

[0075] An alternative distributed control configuration, in accordance with at least one embodiment of the present invention, is disclosed in FIG. 9A-9C. In FIG. 9A, distributed control components 702 continue to be linked by MCS 700. However, now distributed control component 704 may also be directly coupled to distributed control components 702 via an MCS interface. As a result, distributed control component 704 may also utilize and benefit from MCS 700 for transactions involving the various communication components of WCD 100.

[0076] Referring now to FIG. 9B, the inclusion of distributed control component 704 onto MCS 700 is shown in more detail. Distributed control component 704 includes at least priority controller 740 coupled to MCS interface 750. MCS interface 750 may allow priority controller 740 to send information to, and receive information from, radio activity controllers 720 via a low-traffic connection dedicated to the coordination of communication resources in WCD 100. As previously stated, the information provided by priority controller 740 may not be deemed delay sensitive information, however, the provision of priority information to radio activity controllers 720 via MCS 700 may improve the overall communication efficiency of WCD 100. Performance may improve because quicker communication between distributed control components 702 and 704 may result in faster relative priority resolution in radio activity controllers 720. Further, common interface system 620 of WCD 100 may be relieved of having to accommodate communication traffic from distributed control component 704, reducing the

overall communication load in master control system 640. Another benefit may be realized in communication control flexibility in WCD 100. New features may be introduced into priority controller 740 without worrying about whether the messaging between control components will be delay tolerant or sensitive because an MCS interface 710 is already available at this location.

[0077] FIG. 9C discloses possible operational effects on communication in WCD 100 in view of the enhancements implemented in the current alternative embodiment of the present invention. The addition of an alternative route for radio modem control information to flow between distributed control components 702 and 704 may both improve the communication management of radio activity controllers 720 and lessen the burden on master control system 640. In this embodiment, all distributed control components of MCS 700 are linked by a dedicated control interface, which provides immunity to communication coordination control messaging in WCD 100 when the master control system 640 is experiencing elevated transactional demands.

[0078] An example message packet 900, in accordance with various embodiments of the present invention, is disclosed in FIG. 10. Message packet 900 may include, for example, activity pattern information that may be formulated by MRC 600 or radio activity controller 720. An example data payload of packet 900 may include at least Message ID information, allowed/disallowed transmission (Tx) period information, allowed/disallowed reception (Rx) period information, Tx/Rx periodicity (how often the Tx/Rx activities contained in the period information occur), and validity information describing when the activity pattern becomes valid and whether the new activity pattern is replacing or added to the existing one. The data payload of packet 900, as shown, may consist of multiple allowed/disallowed periods for transmission or reception (e.g., Tx period 1, 2…) each containing at least a period start time and a period end time during which radio modem 610 may either be permitted or prevented from executing a communication activity. While the distributed example of MCS 700 may allow radio modem control activity to be controlled real-time (e.g., more control messages with finer granularity), the ability to include multiple allowed/disallowed periods into a single message packet 900 may support radio activity controllers 720 in scheduling radio modem behavior for longer periods of time, which may result in a reduction in message traffic. Further, changes in radio modem 610 activity patterns may be amended using the validity information in each message packet 900.

[0079] The modem activity control signal (e.g., packet 900) may be formulated by MRC 600 or radio activity controller 720 and transmitted on MCS 700. The signal includes activity periods for Tx and Rx separately, and the periodicity of the activity for the radio modem 610. While the native radio modem clock is the controlling time domain (never overwritten), the time reference utilized in synchronizing the activity periods to current radio modem operation may be based on one of at least two standards. In a first example, a transmission period may start after a pre-defined amount of synchronization events have occurred in radio modem 610. Altematively, all timing for MRC 600 or between distributed control components 702 may be standardized around the system clock for WCD 100. Advantages and disadvantages exist for both solutions. Using a defined number of modem synchronization events is beneficial because then all timing is closely aligned with the radio modem clock. However, this strategy may be more complicated to implement than basing timing on the system clock. On the other hand, while timing based on the system clock may be easier to implement as a standard, conversion to modem clock timing must necessarily be implemented whenever a new activity pattern is installed in radio modem 610.

[0080] The activity period may be indicated as start and stop times. If there is only one active connection, or if there is no need to schedule the active connections, the modem activity control signal may be set always on allowing the radio modems to operate without restriction. The radio modem 610 should check whether the transmission or reception is allowed before attempting actual communication. The activity end time can be used to check the synchronization. Once the radio modem 610 has ended the transaction (slot/packet/burst), it can check whether the activity signal is still set (it should be due to margins). If this is not the case, the radio modem 610 can initiate a new synchronization with MRC 600 or with radio activity controller 720 through synchronizer 730. The same thing may happen if a radio modem time reference or connection mode changes. A problem may occur if radio activity controller 720 runs out of the modem synchronization and starts to apply modem transmission/reception restrictions at the wrong time. Due to this, modem synchronization signals need to be updated periodically. The more active wireless connections, the more accuracy is required in synchronization information.

VIII. Radio modem interface to other devices.

[0081] As a part of information acquisition services, MCS interface 710 may need to send information to MRC 600 (or radio activity controllers 720) about periodic events of the radio modems 610. Using its MCS interface 710, the radio modem 610 may indicate a time instance of a periodic event related to its operation. In practice these instances may include times when radio modem 610 is active and may be preparing to communicate or communicating. Events occurring prior to or during a transmission or reception mode may be used as a time reference (e.g., in case of GSM, the frame edge may be indicated in a modem that is not necessarily transmitting or receiving at that moment, but we know based on the frame clock that the modem is going to transmit [x]ms after the frame clock edge). Basic principle for such timing indications is that the event is periodic in nature. Every incident needs not to be indicated, but the MRC 600 may calculate intermediate incidents itself. In order for that to be possible, the controller may also require other relevant information about the event, e.g. periodicity and duration. This information may be either embedded in the indication or the controller may get it by other means. Most importantly, timing indications need to be such that the controller can acquire a radio modem's basic periodicity and timing. The timing of an event may either be in the indication itself, or it may be implicitly defined from the indication information by MRC 600 (or radio activity controller 720).

[0082] In general terms these timing indications need to be provided on periodic events like: schedule broadcasts from a base station (typically TDMA/MAC frame boundaries) and own periodic transmission or reception periods (typically Tx/Rx slots). Those notifications need to be issued by the radio modem 610: (1) on network entry (i.e. modem acquires network synchrony), (2) on periodic event timing change e.g. due to a handoff or handover and (3) as per the policy and configuration settings in the multiradio controller (monolithic or distributed).

[0083] In at least one embodiment of the present invention, various messages that are exchanged between the aforementioned communication components in WCD 100 may be used to dictate behavior on both a local (radio modem level) and global (WCD level) basis. MRC 600 or radio activity controller 720 may deliver a schedule to radio modem 610 with the intent of controlling that specific modem, however, radio modem 610 may not be compelled to conform to this schedule. The basic principle is that radio modem 610 is not only operating according to

multiradio control information (e.g., operates only when MRC 600 allows) but is also performing internal scheduling and link adaptation while taking MRC scheduling information into account.

IX. Example software-defined radio (SDR) module.

[0084] The various examples of multiradio control implementation disclosed herein have been explained utilizing only hardware-based radio modules. A hardware-based radio module may be, for example, a radio module that relies primarily upon hardware components and static software elements (e.g., hard-coding or rewritable code that does not change during operation) for establishing communication. However, in accordance with at least one embodiment of the present invention, one or more transports may be supported in an apparatus by radio modules that rely more heavily upon a reconfigurable software-based element. The software-based element may be reconfigured at runtime, and therefore, these radio modules may be reconfigured to emulate various functionality that was traditionally only available through discrete modules.

[0085] In general, software-based elements may be implemented using known software tools (e.g., languages, compiled code, etc.) to establish instruction sets (e.g., programs, modules, etc.) that are executable by a processor. The functionality of a hardware-based component, or one or more elements of a hardware-based component, may be "defined" in terms of a set of instructions or conditions that exist within a program or module. Programs may be stored, for example, in a static or dynamic memory within an apparatus. When executed by a processor, these programs may access, manipulate, configure, etc. hardware elements in the apparatus in order to create the desired functionality. Examples of memory may include fixed or removable computer-readable media in a variety of formats (e.g., magnetic, optical, electronic, etc.).

[0086] An example implementation of a software-defined radio (SDR) module usable in accordance with various embodiments of the present invention is disclosed in FIG. 11. Initially, a partial representation of an example WCD 100, such, for example, as previously described herein with respect to various multiradio implementation examples, is shown at 1100. In this example, WCD 100 may employ distinct hardware-based communication modules corresponding to, for example, long-range communications 310, broadcast receivers 312 and short-range communications 320. However, the configuration of multiradio systems is not specifically limited to the structure shown at 1100.

[0087] For example, an alternative communication configuration for WCD 100 is shown at 1102. In this example, the apparatus may incorporate at least one SDR module 1104 in lieu of one or more discrete hardware-based radio modules. While the flexibility of SDR module 1104 may provide an option of omitting some communication hardware from WCD 100, this does not preclude the incorporation of one or more hardware-based modules 1106. Implementations incorporating both SDR radio modules 1104 and hardware-based modules 1106 (represented as optional in FIG. 11 through the use of dotted lines) are possible. Combined hardware-based and software-based technology implementations may be employed, for example, in situations where specialized hardware is required to support particular transports, it is more economical to implement a hardware-based solution for a particular transport, an SDR module 1102 and a hardware-based module 1106 are used to support transports that often operate concurrently (e.g., transports that do not interfere with each other, and therefore, can operate at the same time), etc.

[0088] Now referring to FIG. 12, a more detailed example of a SDR module is disclosed in accordance with at least one embodiment of the present invention. "Radio computers," which fall within the broader software-defined radio (SDR) concept, include platform architectures in which the different radio systems are loaded as software (e.g., as radio programs) and in which as single HW/SW platform can be used to implement different wireless connectivity features on shared processing resources. The radio programs may serve the purpose of cellular communication, local connectivity, broadcast, navigation, etc., and they can be integrated into legacy (existing) radio systems or form totally new radios. Further, "cognitive" radios include the ability to sense the surrounding environment and to share this information with peers. The sensed information may be utilized, for example, in distributed sensing strategies that allow apparatuses to make localized decisions in view of the entire environment when configuring communication.

[0089] FIG. 12 explains an example of a possible implementation of a SDR 1102 utilizing a previously disclosed embodiment of the present invention. SDR 1102 may interact with multiradio control features (e.g., MRC 600) via MCS 700 and/or via common interfaces that may be components of master control system 640. For example, SDR 1102 may include a multiradio access interface 1108 configured for the transmission and reception of delay-sensitive information via MCS 700. In addition, flow controller 1112 in SDR 1102 may interact with

programs in master control system 640 in order to regulate the flow of messages being sent from, and being received into, SDR 1102. Multiradio access interface 1108 and flow controller 1112 may interact with various software components within SDR 1102 to emulate various hardware-based radio modules.

[0090] For example, information received via the aforementioned interfaces may be used to determine how SDR 1102 is to be configured. As part of this configuration, radio connection manager 1110 may receive data from multiradio access interface 1108 and/or flow controller 1112. This data may include at least one of instruction information (e.g., rules or preferences regarding which transports to utilize in certain situations) and messages awaiting transmission. Radio connection manager 1110 may then interact with some or all of configuration manager 1114, local multiradio control 1116 and resource manager 1118 in order to configure SDR 1102. For instance, configuration manager 1114 may provide information regarding resources required for supporting a particular wireless transport, and resource manager 1118 may determine if these resources are available. If radio connection manager 1110 decides that it is possible to configure SDR 1102 to support the particular wireless transport (e.g., in view of the information provided by the other modules) then local multiradio control 1116 may implement the configuration. While an example of a usable configuration for SDR 1102 has been disclosed in FIG. 12, other configurations are also possible in accordance with various embodiments of the present invention. For example, in an alternate configuration the functionality of MRC 600 and local multiradio controller 1116 may be implemented as a single functional element in WCD 100.

[0091] In implementing a particular radio configuration, some or all of software modules 1110-1118 may interact with unified radio system interface 1120 in order to establish settings that will allow SDR 1102 to emulate a desired radio functionality. For example, unified radio systems may include both protocol information 1122 and device information 1124 that may be usable when replicating the functionality of hardware-based radios. The configured software resources may then access hardware resources (e.g., antennas 1126) to send and/or receive wireless messages. For example, information in protocols 1122 and devices 1124 may be accessed and/or manipulated in order to emulate the functionality of a radio module that is configured to operate using a first transport (e.g., Bluetooth™ (BT)), and at the conclusion of activity may be reconfigured to support other communication in WCD 100 (e.g., WLAN).

[0092] In addition, it may be possible for SDR module 1108 to have cognitive features. Characteristics like apparatus status (e.g., process load, pending messages, power condition, etc.) and the environment proximate to an apparatus may be utilized to configure SDR module 1102. For example, resources in SDR module 1102, another radio module, or elsewhere in WCD 100 may be able to identify signals that could potentially interfere with apparatus communication. The identification of signal interference may be provided from sensor information (e.g., a sensor may detect a signal in proximity to an apparatus) and/or may be identified through information that is already "known" to WCD 100. For example, MRC 600 may schedule communication in a multiradio system, and therefore, some or all of the schedule information may be provided to, or accessed by, SDR module 1102. Regardless of the source, information on potential interference signals may be utilized when determining the optimum configuration for SDR module 1102.

[0093] In accordance with various embodiments of the present invention, SDR module 1102 may interact with various program modules 1128 residing in at least one of MRC 600 or master control system 640. Program modules 1128 may provide apparatus side coordination of communication when, for example, multiple SDR modules 1102 are active, or when SDR module 1102 is active at the same time as a hardware-based radio module. Example program modules that may exist within program modules 1128 include, but are not limited to, mobility policy manager 1130, networking stack 1120 and administrator 1134. In at least one scenario, mobility policy manager 1130 may define preferences and/or rules that control utilization of transports in an apparatus (e.g., WCD 100). These preferences and/or rules may be based on various apparatus, application or user-defined characteristics. For example, the number of messages pending for each transport in networking stack 1132 may determine the next transport that will be implemented (e.g., a priority between the active transports), and therefore, the next configuration for SDR module 1102. In making this determination, mobility policy manager 1130 may work with administrator 1134 to create an appropriate implementation schedule so that communication may continue within the guidelines set forth in the preferences and/or rules.

X. Example configuration methodology for SDR modules

[0094] As generally set forth above, an apparatus may utilize a variety of characteristic information when determining how to configure a SDR module 1102. However, characteristic information pertaining only to the apparatus itself may not address all issues that could

potentially influence a transaction (e.g., including characteristics that may exist in one or more apparatuses with which communication is desired). In accordance with various embodiments of the present invention, conditions that exist in or around other apparatuses participating in wireless communication may, in some instances, alter the determination process with respect to configuring SDR module 1102.

[0095] FIG. 13 discloses an example including two apparatuses. While FIG. 13 discloses a scenario where a first apparatus desires to establish wireless communication (e.g., a wireless link) with a second apparatus, this example is presented herein only for the sake of explanation. As such, the present invention is not limited only to the disclosed interaction (e.g., may involve more than two apparatuses) or any particular wired or wireless transports. Further, while various implementations of the present invention have been described herein as integrated with a multiradio control system, various embodiments of the present invention may also operate in standalone situations (e.g., configurations where no multiradio control has been established).

[0096] In this non-limiting example, apparatus A 1300 has a requirement to interact with apparatus B 1302 in FIG. 13. Such a requirement to establish communication may be initiated by, for example, applications and/or utilities executing on apparatus A 1300, user interaction with apparatus A 1300, etc. In response to this requirement, apparatus A 1300 may send a wireless inquiry to apparatus B 1302. The wireless inquiry may be sent, for example, utilizing a channel (e.g., an initialization channel) that is known to (e.g., predefined or predetermined) each apparatus. Apparatus B 1302 may acknowledge receipt of the inquiry from apparatus A 1300, and may in turn respond with one or more messages accepting the invitation to communicate and containing remote characteristics. Remote characteristics comprise information related to the apparatus with which communication is desired (e.g., apparatus B 1302), and may include information regarding apparatus status and/or environmental conditions proximate to the apparatus. For instance, apparatus status information may include apparatus communication capabilities and/or preferences, current apparatus power condition, current apparatus operational condition, current communication activity including transports active in the apparatus and a number of messages pending for each active transport, etc. Information pertaining to environmental conditions may include signals sensed in proximity to the apparatus that may potentially cause interference, communication scheduled in the apparatus, the identification of

other apparatuses operating in proximity, etc. Some or all of this information may be provided in response to the inquiry of apparatus A 1300.

[0097] Apparatus A 1300 may also determine characteristics pertaining to itself, which are designated local characteristics in FIG. 13. Local characteristics may include all of the information discussed above with respect to remote characteristics, but from the perspective of the initiating apparatus. While local characteristics are formulated after remote characteristics in the example of FIG. 13, the determination of local characteristics is not limited to this temporal organization. In particular, the determination of local characteristics may occur before, during or after the receipt of remote characteristics from apparatus B 1302. Once Apparatus A 1300 has both the remote and local characteristic information, a configuration for SDR module 1102 may be formulated. The configuration may define a transport, or a list of transports (e.g., in priority order), for use in communication with apparatus B 1302, channel selection for each transport (e.g., hopping patterns), error correction, Quality of Service (QoS) requirements, operational schemes (e.g., power saving, high speed, etc.), radio module priority (for conflict resolution), etc.

[0098] After formulation of the configuration is complete, the configuration may be sent to apparatus B 1302. In various embodiments of the present invention, the configuration may be sent to apparatus B 1302 on the initialization channel. Apparatus A 1300 and apparatus B 1302 may then set the configuration. Setting a configuration may include, for example, programming one or more SDR modules 1102 in each apparatus for establishing communication in accordance with the configuration. After the configuration is set in apparatus A 1300 and apparatus B 1302, either apparatus may initiate communication (e.g., establish a wireless link between apparatuses).

[0099] It is important to note that, in various embodiments of the present invention, the communication may continue in accordance with the existing configuration until an event occurs that would necessitate a new configuration. Examples of events that may necessitate a new configuration may include, but are not limited to, fulfillment of the communication requirement, a loss of wireless connection between the apparatuses, sensed interference in proximity to either apparatus, a higher priority communication in one or both of the apparatuses that could conflict with current communication, a status change in either apparatus (e.g., power depletion), etc.

[00100] A flowchart of an example configuration process in accordance with at least one embodiment of the present invention is disclosed in FIG. 14A. The process may begin in step 1400 with the realization of a communication requirement in an apparatus. A determination may then be made in step 1402 as to whether any other apparatuses that can fulfill the requirement are within communication range of the apparatus. If no other apparatuses are discovered, then in step 1404 the process may enter a failure mode, wherein the failure mode may include one or more activities executed when the requirement cannot be fulfilled. Activities may include, for example, a visible, audible or tactile notification of communication failure to an apparatus user. The process may then return to step 1400 to await subsequent requirements for communication.

[00101] If at least one other apparatus that can fulfill the communication requirement is detected within range of the apparatus, then in step 1406 a connection request may be sent to the other apparatus. Connection requests may be sent on a channel known to both apparatuses (e.g., an initialization channel). If no response is received from the other apparatus in step 1408, then in step 1410 a determination may be made as to whether a retry condition has been exceeded. Examples of retry conditions include a duration of time since the original connection attempt, a number of retries, etc. Connection requests may continue in step 1406 until the retry condition is exceeded (step 1410), at which point the failure mode described in step 1404 may be triggered.

[00102] If the other apparatus acknowledges the connection request, then in step 1412 an inquiry may be sent to the other apparatus. The inquiry may request, or trigger the provision of, remote characteristic information from the other apparatus. If remote characteristic information is not received in step 1414, then a determination may be made in step 1408 as to whether the wireless connection was lost. If a response is received in step 1414 (e.g., including remote characteristics pertaining to the other apparatus), then in step 1416 local characteristics related to the initiating apparatus may be determined. As stated above, steps 1414 and 1416 do not have to occur in the order depicted in FIG. 14A, as the determination of local characteristics may occur in the initiating apparatus before, during or after the receipt of the remote characteristics.

[00103] The initiating apparatus may then formulate a configuration based on at least the remote characteristic information and the local characteristic information in step 1418. The completed configuration may, for example, allow an apparatus to program one or more SDR modules 1102 for wireless communication. The configuration may then be sent to the other

apparatus in step 1420. In accordance with at least one embodiment of the present invention, the configuration may be sent from the initiating apparatus to the other apparatus on the initialization channel. For example, the configuration may be set in the initiating apparatus (step 1422) by ceasing interaction with the other apparatus on the initialization channel, and then programming one or more SDR modules 1102 to communicate in accordance with the configuration.

[00104] In step 1424 the connection defined by the configuration may be established. The connection may be, for example, a wireless link on a channel different than the initialization channel, or even via a totally different wireless transport. If a connection fails to be established, as determined in step 1426, then the process may return to step 1402 to determine if the other apparatus can still be detected. For example, the other apparatus originally discovered in step 1402 may have moved outside of the range of the wireless transport configured in step 1422 by the time a connection is attempted in step 1424. If the connection (e.g., wireless link) defined by the configuration is established in step 1426, the connection may continue in step 1428 until an event occurs that would necessitate the formulation of a new configuration. For example, completion of the current communication requirement, an interference signal sensed in proximity to one or both apparatuses, a higher priority communication in one of the apparatuses, etc. may be considered events that would cause the process to return to step 1400 in preparation for the formulation of a new configuration based on, for example, a new communication requirement.

[00105] A flowchart depicting an example process for establishing a wireless connection from the perspective of an apparatus that is receiving the initial inquiry, in accordance with at least one embodiment of the present invention, is now disclosed with respect to FIG. 14B. Initially, a wireless communication may be received by an apparatus (e.g., apparatus B 1302) in step 1450. A determination may then be made in step 1452 as to whether the communication comprises an inquiry requesting characteristic information from the receiving apparatus. If no characteristic information is requested, then in step 1454 a link may be negotiated in accordance with standard communication methodology (e.g., based on the protocol for the wireless transport that is currently being utilized), which may be followed by link establishment in step 1456.

[00106] If in step 1452 a determination is made that a characteristic information inquiry is present in the received communication, then the receiving apparatus may formulate characteristic information concerning itself (e.g., in accordance with the various examples presented herein).

While characteristic information formulation is shown as step 1458 in the FIG. 14B process, the formulation of characteristic information is not strictly limited to this instance. The formulation of characteristic information may also occur before receiving the inquiry, periodically, etc. A response may then be sent to the inquiring apparatus in step 1460, the response comprising at least the characteristic information. The receiving device may then enter a waiting loop in steps 1462 and 1464. For example, the receiving apparatus may wait for a configuration from the initiating apparatus until a condition is exceeded (e.g., until a duration from the time that the characteristic information response was sent, until a number of retry transmissions has been exceeded, etc.). In the example of a retry limit condition, the receiving apparatus may attempt to resend the characteristic information response in order to ensure that this information was successfully received. If no configuration is received, and the condition is exceeded in step 1464, then in step 1466 an error condition may commence. Examples of activities that may be executed in an error condition may include, for example, displaying notification to a user that no configuration was received, reformulating and retransmitting the characteristic information to the initiating apparatus, verification of the presence of the initiating apparatus, etc. The process may then restart in step 1450 with the receiving apparatus awaiting further communication.

[00107] If in step 1462 a communication configuration is received from the initiating apparatus, then in step 1468 the received communication configuration may be implemented in the receiving apparatus. Implementation of the configuration in the receiving apparatus may include, for example, the configuration of a hardware-based radio module (or alternatively of a SDR module enabled to emulate hardware-based radio functionality) to communicate utilizing particular wireless transports, particular channels or certain features/modes (e.g., error checking, power saving, etc.). A link in accordance with the received communication configuration may then be established in step 1456. After the communication transaction is completed, the process may again reinitiate in step 1450, wherein the receiving apparatus awaits further communication.

[00108] Accordingly, it will be apparent to persons skilled in the relevant art that various changes in forma and detail can be made therein without departing from the spirit and scope of the invention. The breadth and scope of the present invention should not be limited by any of the above-described example embodiments, but should be defined only in accordance with the following claims and their equivalents.

WHAT IS CLAIMED:

1. A method, comprising:

initiating an inquiry from an apparatus to at least one other apparatus;

receiving remote characteristic information into the apparatus, the remote characteristic information corresponding to the at least one other apparatus;

determining local characteristic information in the apparatus;

formulating a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

sending the configuration from the apparatus to the at least one other apparatus;

implementing the configuration in the apparatus; and

establishing communication between the apparatus and at least one other apparatus in accordance with the configuration.

2. The method of claim 1, wherein the inquiry is conducted via an initialization channel that is established in both the apparatus and the at least one other apparatus.

3. The method of claim 1, wherein remote characteristic information comprises at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus, and user preferences configured in the at least one other apparatus.

4. The method of claim 1, wherein local characteristic information comprises at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus, and user preferences configured in the apparatus.

5. The method of claim 1, wherein the configuration comprises at least information that is required by the apparatus and the at least one other apparatus in order to establish communication via a wireless transport, the wireless transport being determined based on the remote characteristic information and the local characteristic information.

6. The method of claim 1, wherein the configuration is sent via an initialization channel that is established in both the apparatus and the at least one other apparatus, the at least one other apparatus implementing the configuration that was sent from the apparatus.

7. The method of claim 1, wherein implementing the configuration comprises discontinuing communication occurring on an initialization channel and resetting resources in the apparatus and the at least one other apparatus in accordance with the configuration.

8. The method of claim 1, wherein the communication between the apparatus and the at least one other apparatus is established via a wireless transport that is different from the wireless transport utilized to transmit the inquiry from the apparatus.

9. A computer program product comprising computer executable program code recorded on a computer readable medium, the computer executable program code comprising:

computer program code configured to initiate an inquiry from an apparatus to at least one other apparatus;

computer program code configured to receive remote characteristic information into the apparatus, the remote characteristic information corresponding to the at least one other apparatus;

computer program code configured to determine local characteristic information in the apparatus;

computer program code configured to formulate a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

computer program code configured to send the configuration from the apparatus to the at least one other apparatus;

computer program code configured to implement the configuration in the apparatus; and

computer program code configured to establish communication between the apparatus and at least one other apparatus in accordance with the configuration.

10. The computer program product of claim 9, wherein the inquiry is conducted via an initialization channel that is established in both the apparatus and the at least one other apparatus.

11. The computer program product of claim 9, wherein remote characteristic information comprises at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus, and user preferences configured in the at least one other apparatus.

12. The computer program product of claim 9, wherein local characteristic information comprises at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus, and user preferences configured in the apparatus.

13. The computer program product of claim 9, wherein the configuration comprises at least information that is required by the apparatus and the at least one other apparatus in order to establish communication via a wireless transport, the wireless transport being

determined based on the remote characteristic information and the local characteristic information.

14. The computer program product of claim 9, wherein the configuration is sent via an initialization channel that is established in both the apparatus and the at least one other apparatus, the at least one other apparatus implementing the configuration that was sent from the apparatus.

15. The computer program product of claim 9, wherein implementing the configuration comprises discontinuing communication occurring on an initialization channel and resetting resources in the apparatus and the at least one other apparatus in accordance with the configuration.

16. The computer program product of claim 9, wherein the communication between the apparatus and the at least one other apparatus is established via a wireless transport that is different from the wireless transport utilized to transmit the inquiry from the apparatus.

17. An apparatus, comprising:

at least one software-defined radio module; and

a processor, the processor being configured to:

initiate an inquiry from to at least one other apparatus;

receive remote characteristic information, the remote characteristic information corresponding to the at least one other apparatus;

determine local characteristic information;

formulate a configuration, the configuration being based on the remote characteristic information and the local characteristic information;

send the configuration to the at least one other apparatus;

implement the configuration; and

establish communication with at least one other apparatus in accordance with the configuration.

18. The apparatus of claim 17, wherein the inquiry is conducted via an initialization channel that is established in both the apparatus and the at least one other apparatus.

19. The apparatus of claim 17, wherein remote characteristic information comprises at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus, and user preferences configured in the at least one other apparatus.

20. The apparatus of claim 17, wherein local characteristic information comprises at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus, and user preferences configured in the apparatus.

21. The apparatus of claim 17, wherein the configuration comprises at least information that is required by the apparatus and the at least one other apparatus in order to establish communication via a wireless transport, the wireless transport being determined based on the remote characteristic information and the local characteristic information.

22. The apparatus of claim 17, wherein the configuration is sent via an initialization channel that is established in both the apparatus and the at least one other apparatus, the at least one other apparatus implementing the configuration that was sent from the apparatus.

23. The apparatus of claim 17, wherein implementing the configuration comprises discontinuing communication occurring on an initialization channel and resetting resources in the apparatus and the at least one other apparatus in accordance with the configuration.

24. The apparatus of claim 17, wherein the communication between the apparatus and the at least one other apparatus is established via a wireless transport that is different from the wireless transport utilized to transmit the inquiry from the apparatus.

25. An apparatus, comprising:

means for initiating an inquiry from the apparatus to at least one other apparatus;

means for receiving remote characteristic information into the apparatus, the remote characteristic information corresponding to the at least one other apparatus;

means for determining local characteristic information in the apparatus;

means for formulating a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

means for sending the configuration from the apparatus to the at least one other apparatus;

means for implementing the configuration in the apparatus; and

means for establishing communication between the apparatus and at least one other apparatus in accordance with the configuration.

26. A method, comprising:

receiving wireless communication in an apparatus;

if the wireless communication includes an inquiry requesting characteristic information, determining characteristic information corresponding to the apparatus;

responding to the inquiry, the response comprising the characteristic information;

receiving further wireless communication in the apparatus, the further wireless communication including a configuration;

implementing the configuration in the apparatus; and

establishing communication in accordance with the configuration.

27. A computer program product comprising computer executable program code recorded on a computer readable medium, the computer executable program code comprising:

computer program code configured to receive wireless communication in an apparatus;

computer program code configured to, if the wireless communication includes an inquiry requesting characteristic information, determine characteristic information corresponding to the apparatus;

computer program code configured to respond to the inquiry, the response comprising the characteristic information;

computer program code configured to receive further wireless communication in the apparatus, the further wireless communication including a configuration;

computer program code configured to implement the configuration in the apparatus; and

computer program code configured to establish communication in accordance with the configuration.

28. An apparatus, comprising:

at least one radio module; and

a processor, the processor being configured to:

receive wireless communication in an apparatus;

if the wireless communication includes an inquiry requesting characteristic information, determine characteristic information corresponding to the apparatus;

respond to the inquiry, the response comprising the characteristic information;

receive further wireless communication in the apparatus, the further wireless communication including a configuration;

implement the configuration in the apparatus; and

establish communication in accordance with the configuration.

29. An apparatus, comprising:

means for receiving wireless communication in an apparatus;

means for, if the wireless communication includes an inquiry requesting characteristic information, determining characteristic information corresponding to the apparatus;

means for responding to the inquiry, the response comprising the characteristic information;

means for receiving further wireless communication in the apparatus, the further wireless communication including a configuration;

means for implementing the configuration in the apparatus; and

means for establishing communication in accordance with the configuration.

ABSTRACT

A system for configuring communication resources that are at least partially based upon reconfigurable software modules. An apparatus may utilize a plurality of transports for communication, wherein the transports are supported by one or more radio modules. The one or more radio modules may comprise hardware-based radio modules and software-defined radio (SDR) modules including a reconfigurable software element that allows the radio module to emulate the functionality of multiple hardware-based radios. In accordance with at least one embodiment of the present invention, SDR modules in an apparatus may formulate a communication configuration for use in communicating with another apparatus based on remote characteristic information (e.g., information corresponding to the apparatus with which communication is desired) and local characteristic information pertaining to the apparatus.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATON
First Named Inventor/Applicant Name:	Pertti TOLONEN
Filer:	Elliot Lyle Frank/Jacqueline Brooking
Attorney Docket Number:	4208-4408

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	310	310
Utility Search Fee	1111	1	510	510
Utility Examination Fee	1311	1	210	210
Pages:				
Claims:				
Claims in excess of 20	1202	9	50	450
Independent claims in excess of 3	1201	5	210	1050
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2530**

Electronic Acknowledgement Receipt

EFS ID:	3883175
Application Number:	12203746
International Application Number:	
Confirmation Number:	3717
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATON
First Named Inventor/Applicant Name:	Pertti TOLONEN
Customer Number:	27123
Filer:	Elliot Lyle Frank/Jacqueline Brooking
Filer Authorized By:	Elliot Lyle Frank
Attorney Docket Number:	4208-4408
Receipt Date:	03-SEP-2008
Filing Date:	
Time Stamp:	17:51:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2530
RAM confirmation Number	3040
Deposit Account	134500
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	4208-4448utiltrn.pdf	120270 6f34df79b12c65c2ba386151432109f856f3b06e	no	4
Warnings:					
Information:					
2	Application Data Sheet	4208-4448ADS.pdf	1026682 7166e6fb05d0c7f4f37ea9ec474701713ecd0645	no	4
Warnings:					
Information:					
3		4208-4448spec.pdf	2124601 97f04ce662ce803e90495ef7edfa2b77910d2f53	yes	42

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	33
Claims	34	41
Abstract	42	42

Warnings:					
Information:					
4	Drawings-only black and white line drawings	4208-4448Drawings.pdf	316529 6716008c9d2634dc4c0820c6ff70b7b897f41faf	no	23
Warnings:					
Information:					
5	Fee Worksheet (PTO-06)	fee-info.pdf	37932 0921292bc58281435f7ddb7711a13db891ae158d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3626014		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

FIG. 1

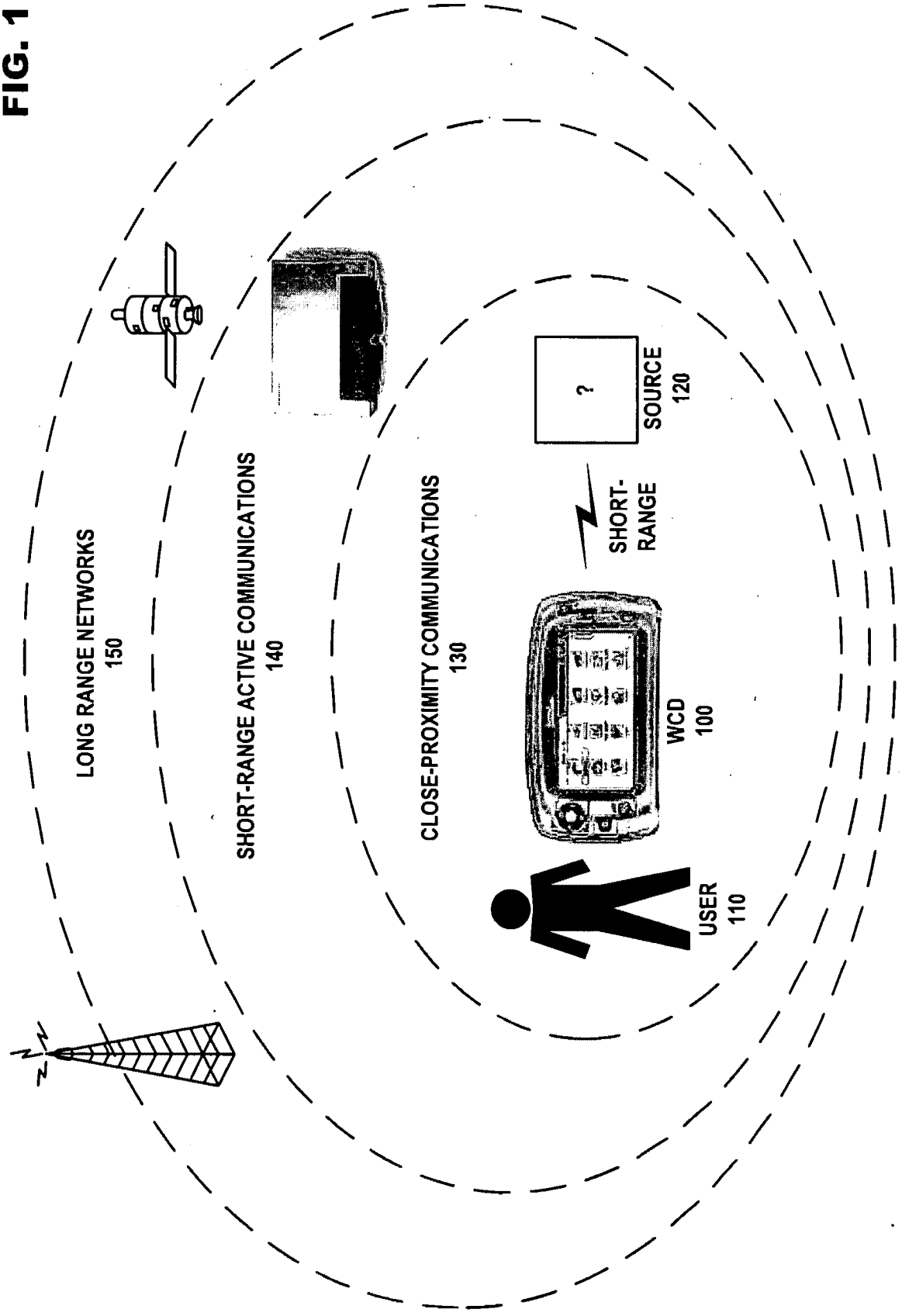

LONG RANGE NETWORKS
150
SHORT-RANGE ACTIVE COMMUNICATIONS
140
CLOSE-PROXIMITY COMMUNICATIONS
130
?
SOURCE
120
SHORT-
RANGE
WCD
100
USER
110

FIG. 2

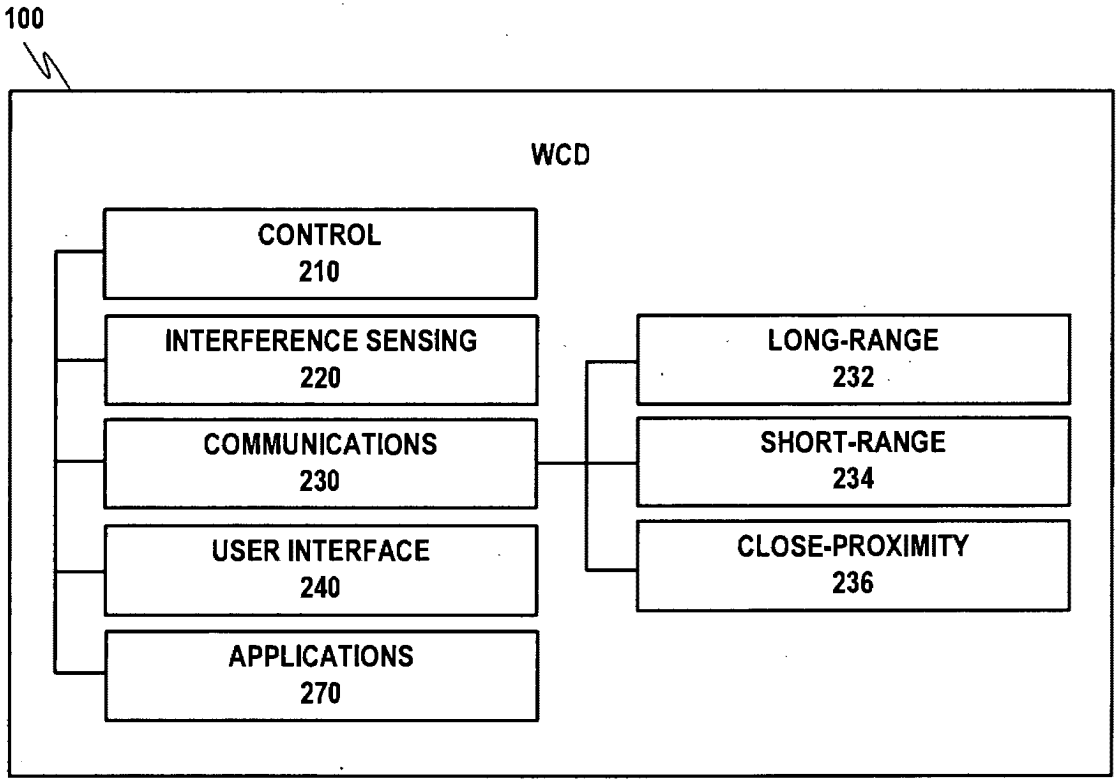

100
WCD
CONTROL
210
INTERFERENCE SENSING
220
COMMUNICATIONS
230
USER INTERFACE
240
APPLICATIONS
270
LONG-RANGE
232
SHORT-RANGE
234
CLOSE-PROXIMITY
236

FIG. 3

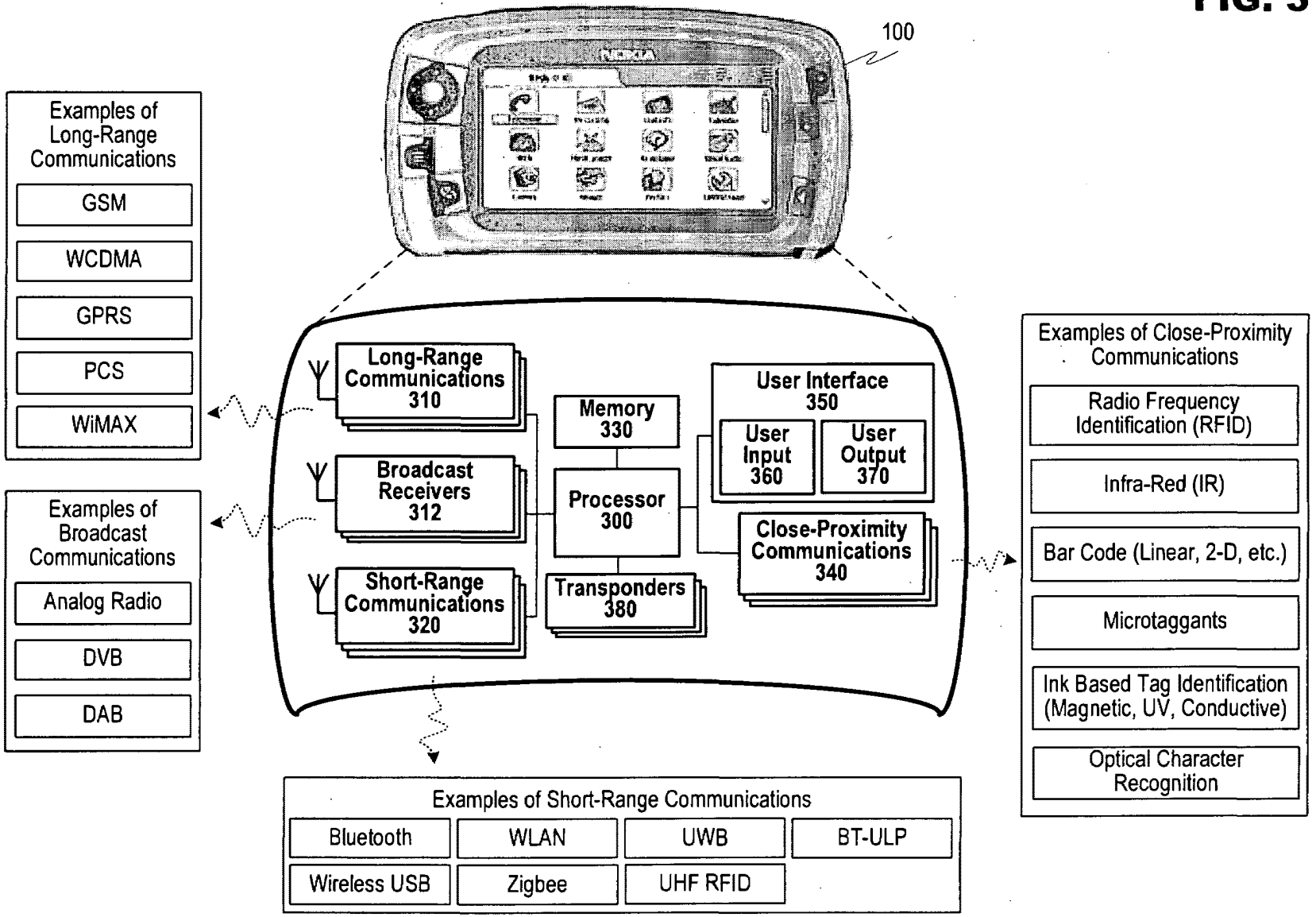


FIG. 4

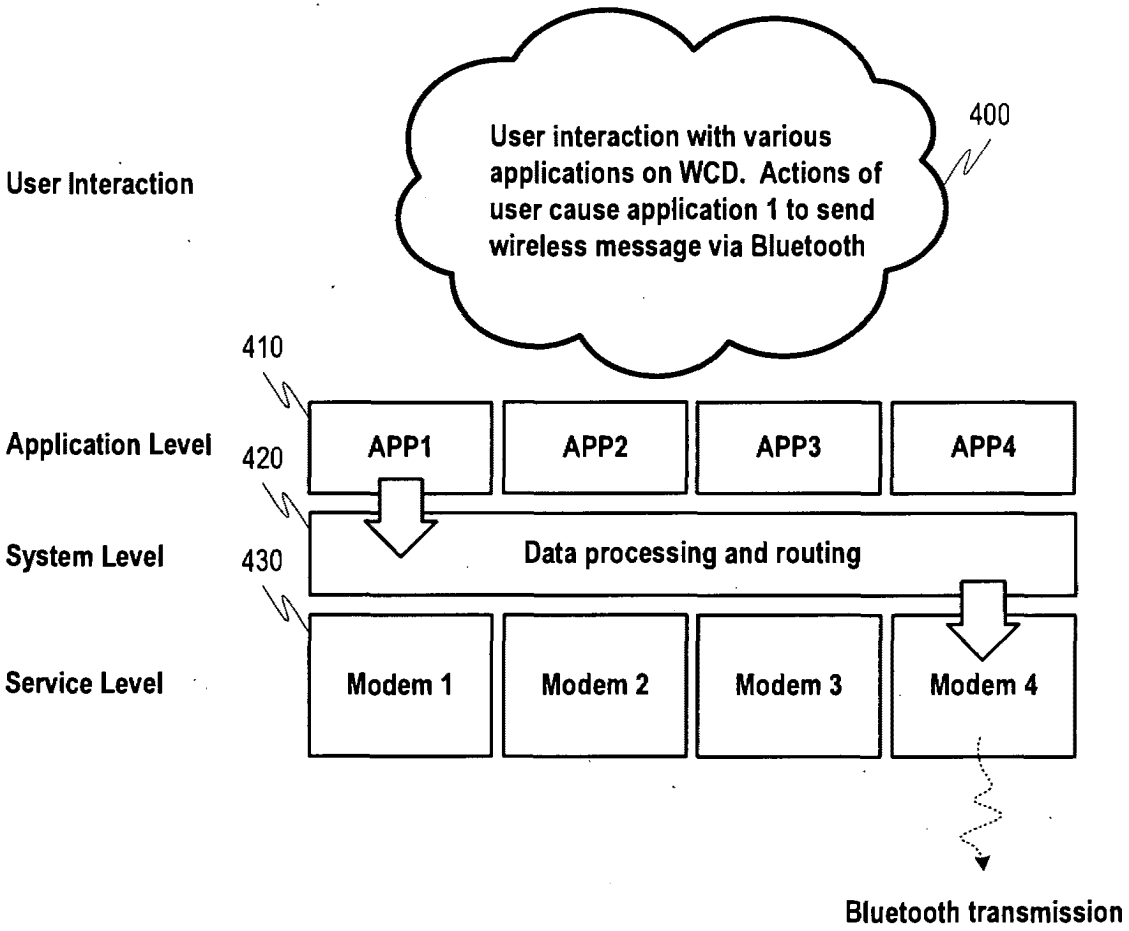

User Interaction
User interaction with various applications on WCD. Actions of user cause application 1 to send wireless message via Bluetooth
400
410
Application Level
APP1
APP2
APP3
APP4
420
System Level
Data processing and routing
430
Service Level
Modem 1
Modem 2
Modem 3
Modem 4
Bluetooth transmission

FIG. 5

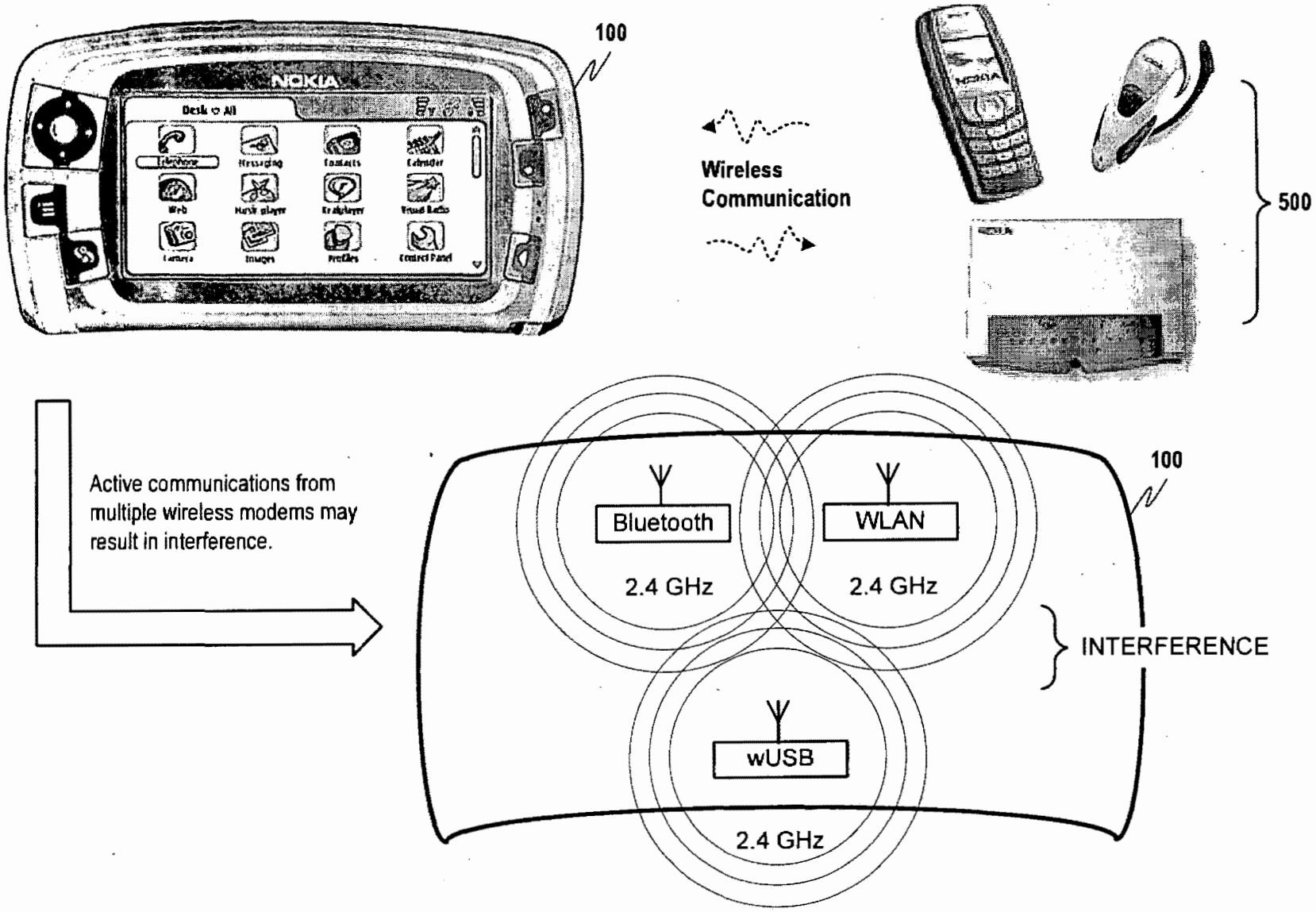

100
Wireless
Communication
500
Active communications from multiple wireless modems may result in interference.
Bluetooth
2.4 GHz
WLAN
2.4 GHz
wUSB
2.4 GHz
INTERFERENCE
100

FIG. 6A

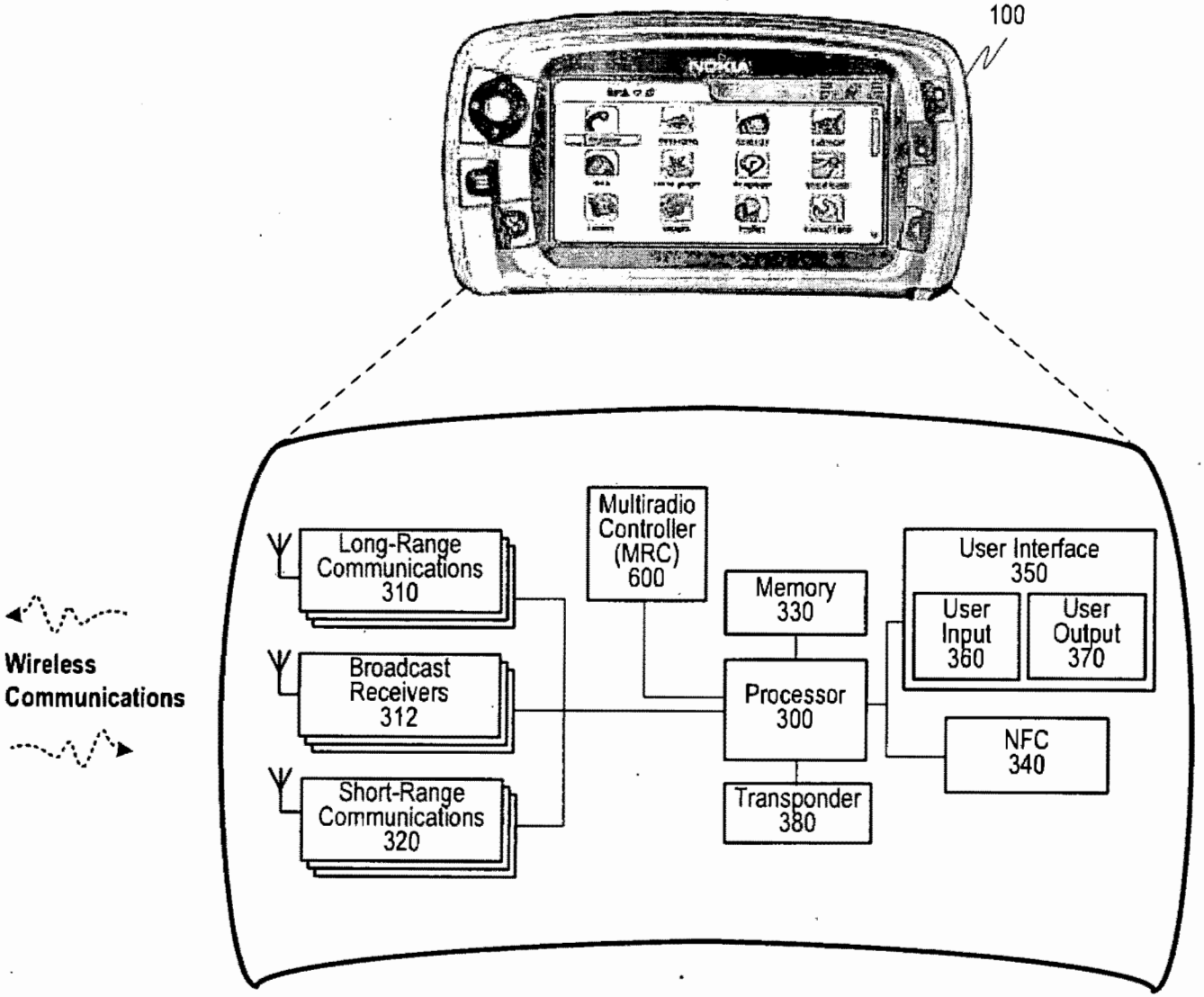

100
Wireless Communications
Long-Range Communications 310
Broadcast Receivers 312
Short-Range Communications 320
Multiradio Controller (MRC) 600
Memory 330
Processor 300
Transponder 380
User Interface 350
User Input 360
User Output 370
NFC 340

FIG. 6B

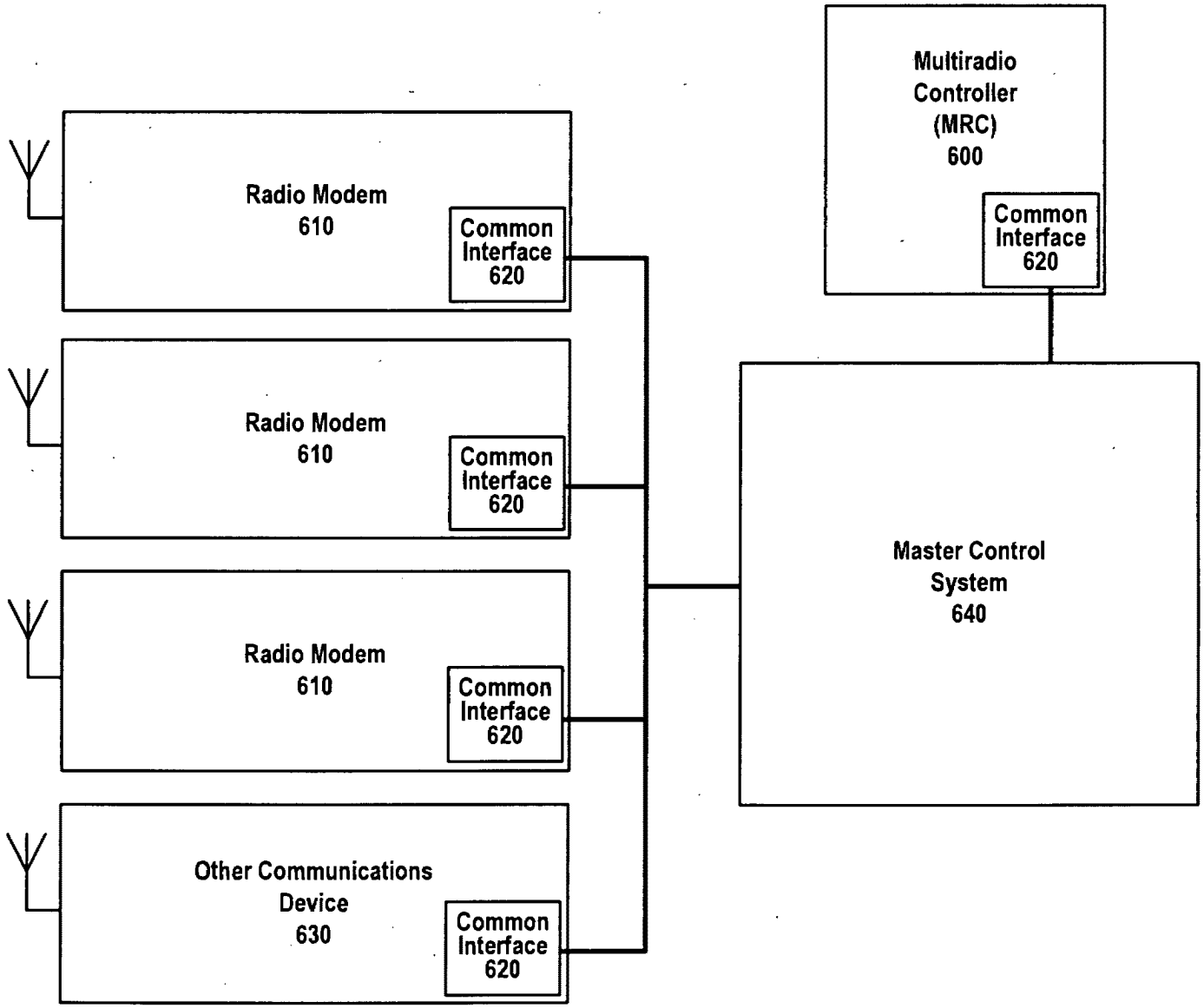

Multiradio Controller (MRC) 600
Common Interface 620
Master Control System 640
Radio Modem 610
Common Interface 620
Radio Modem 610
Common Interface 620
Radio Modem 610
Common Interface 620
Other Communications Device 630
Common Interface 620

FIG. 6C

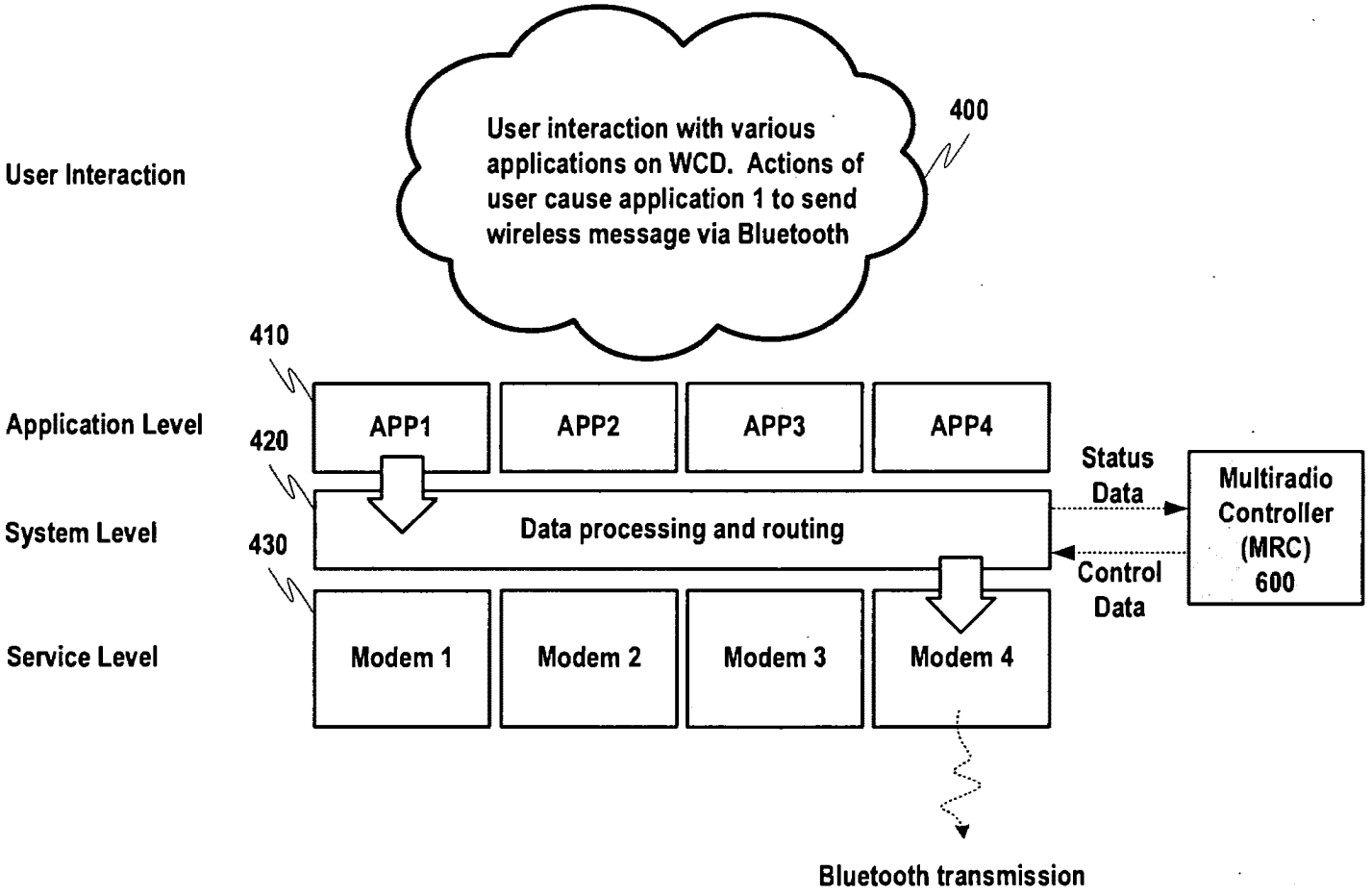
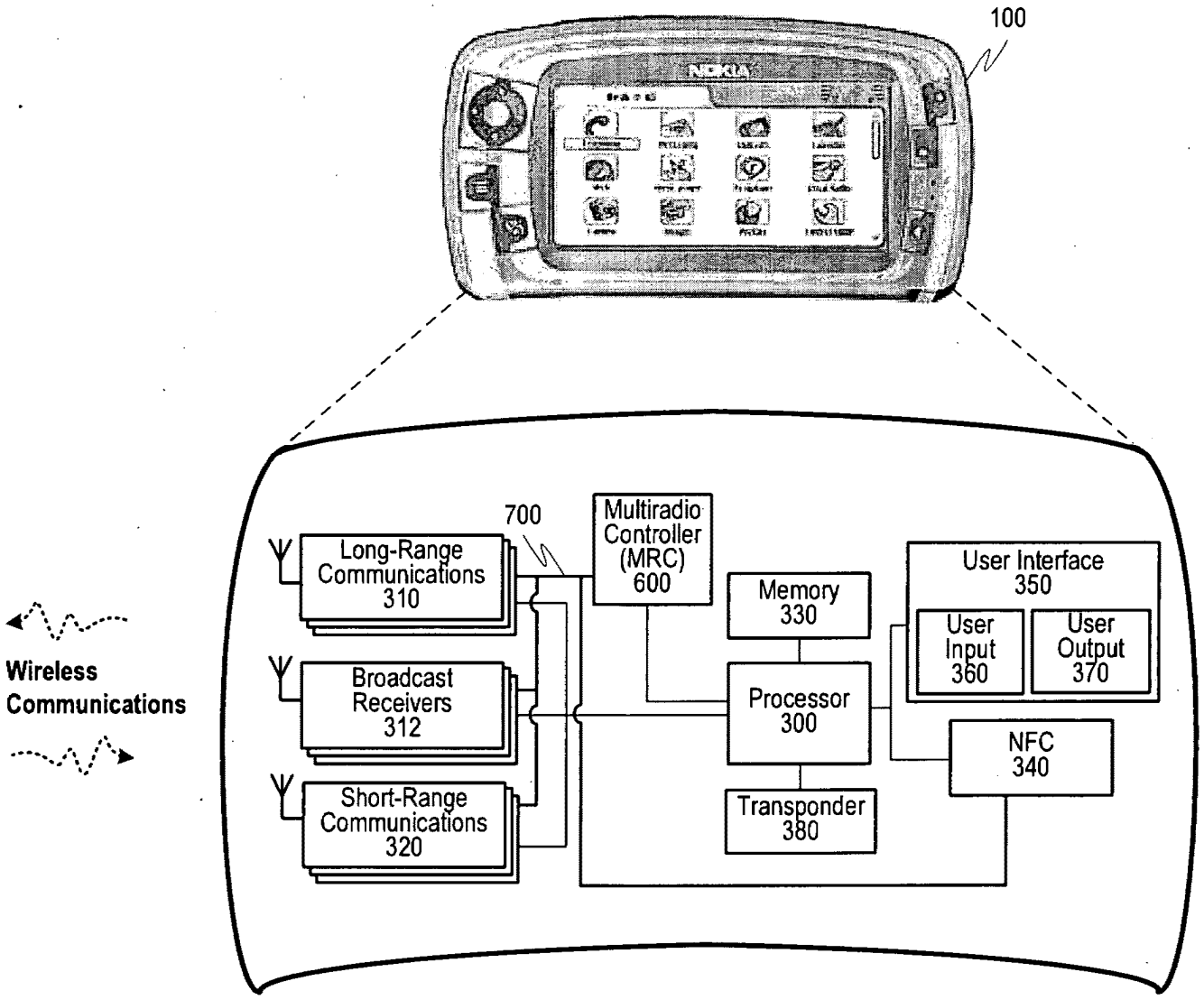

User Interaction
User interaction with various applications on WCD. Actions of user cause application 1 to send wireless message via Bluetooth
400
410
Application Level
APP1
APP2
APP3
APP4
420
System Level
Data processing and routing
Status Data
Control Data
Multiradio Controller (MRC) 600
430
Service Level
Modem 1
Modem 2
Modem 3
Modem 4
Bluetooth transmission

FIG. 7A


100
700
Multiradio Controller (MRC) 600
Long-Range Communications 310
Broadcast Receivers 312
Short-Range Communications 320
Memory 330
Processor 300
Transponder 380
User Interface 350
User Input 360
User Output 370
NFC 340
Wireless Communications

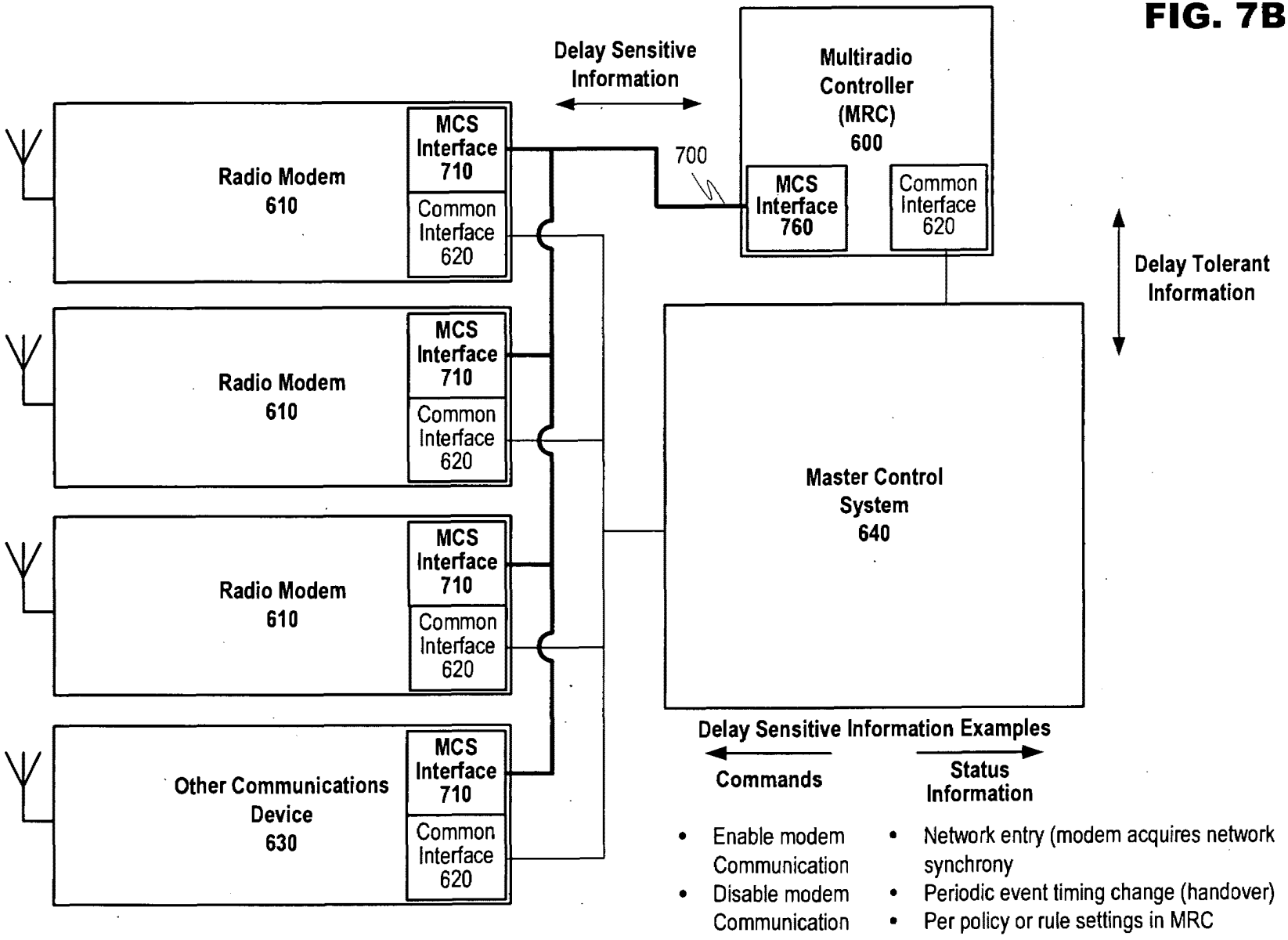


FIG. 7B

FIG. 7C

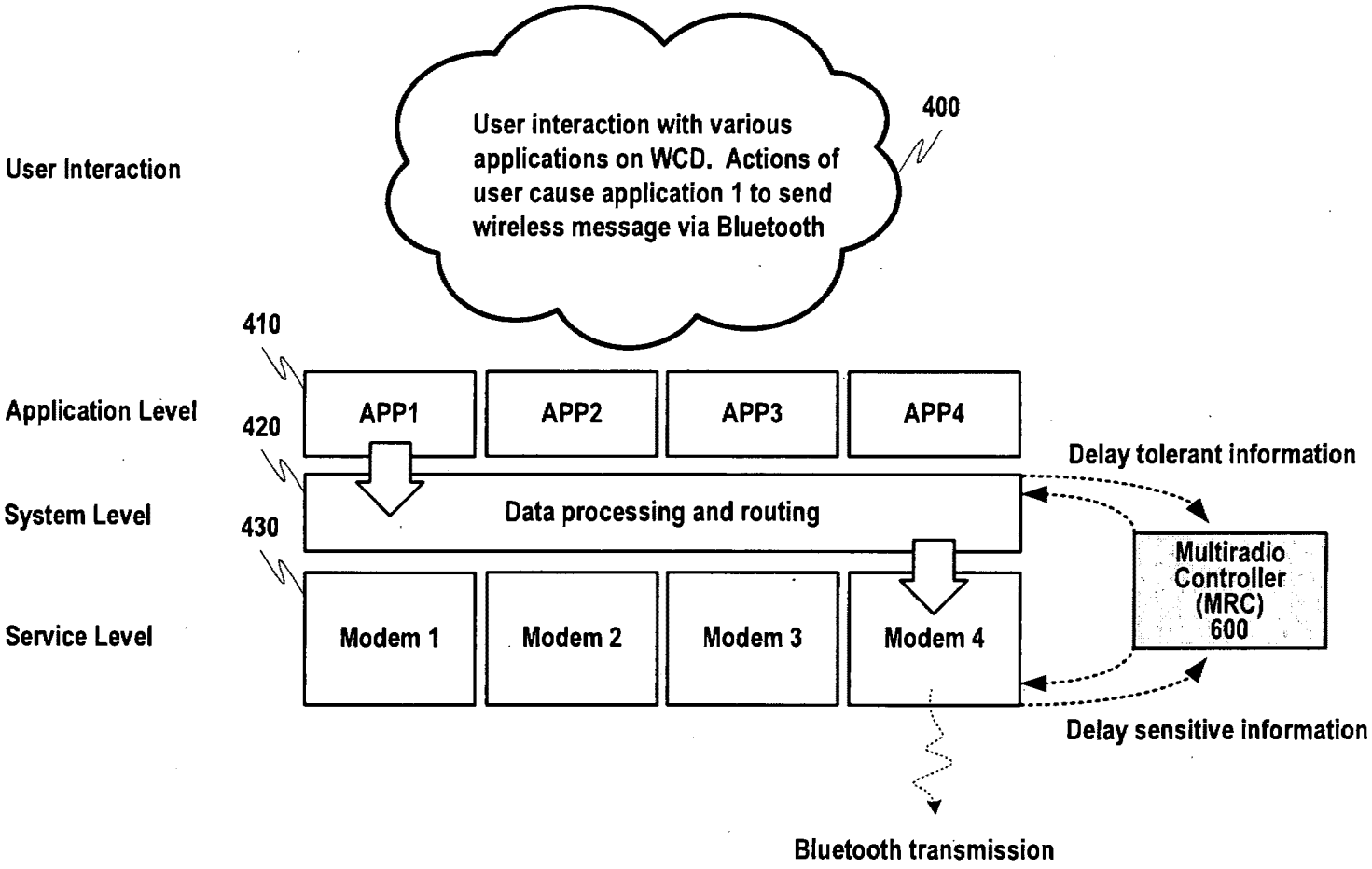


FIG. 8A

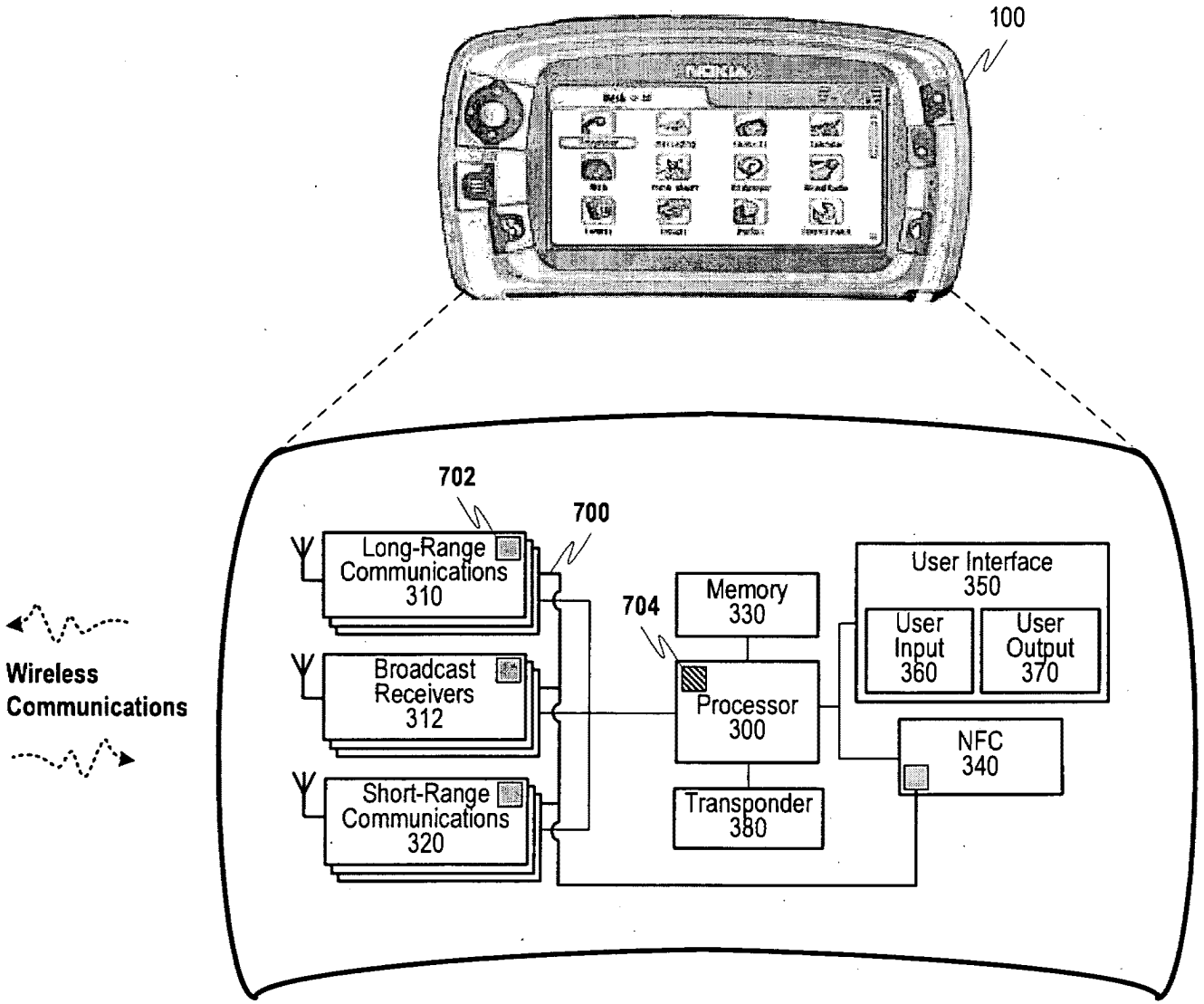

100
702
700
Long-Range Communications 310
Broadcast Receivers 312
Short-Range Communications 320
704
Memory 330
Processor 300
Transponder 380
User Interface 350
User Input 360
User Output 370
NFC 340
Wireless Communications

FIG. 8B

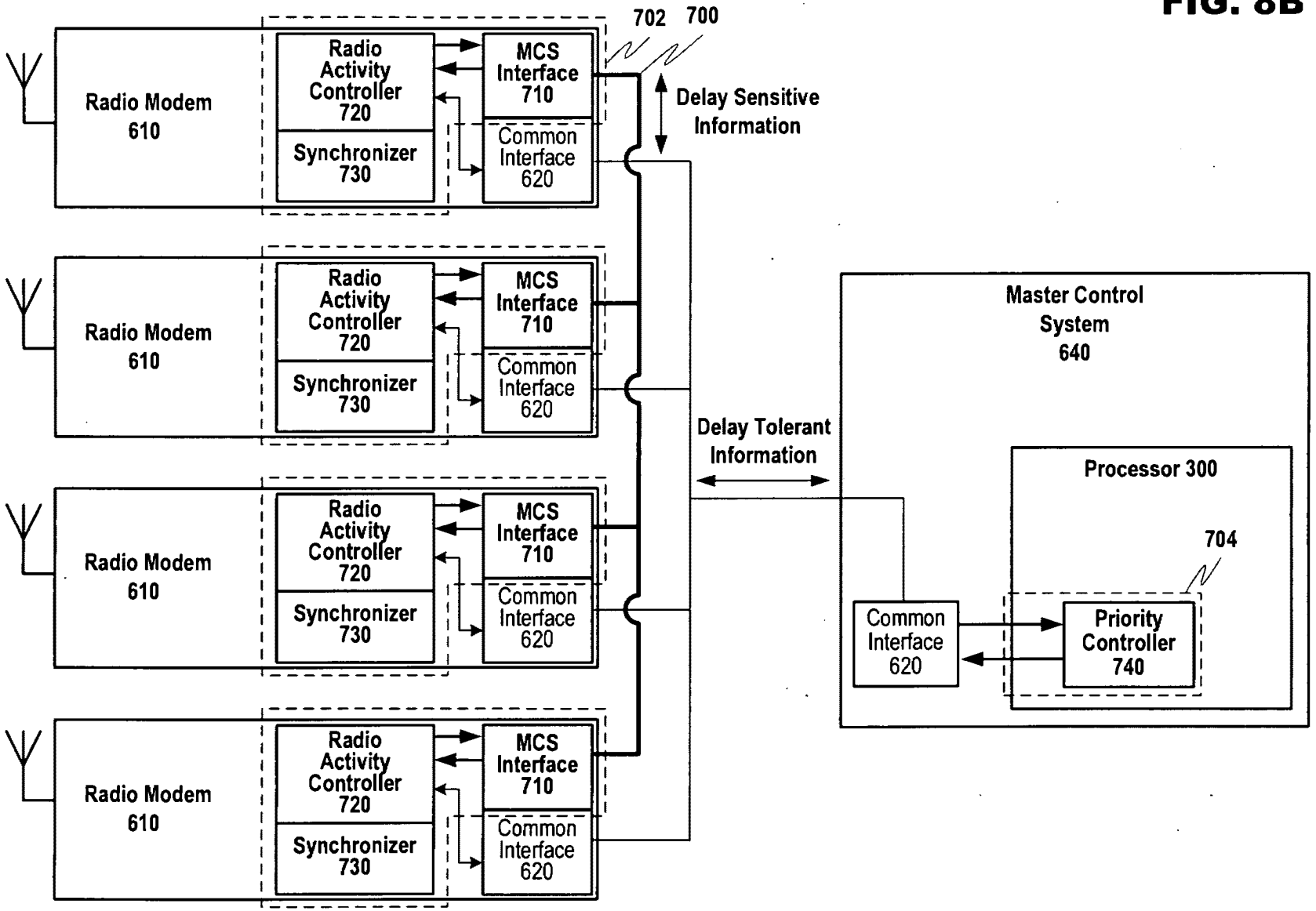


FIG. 8C

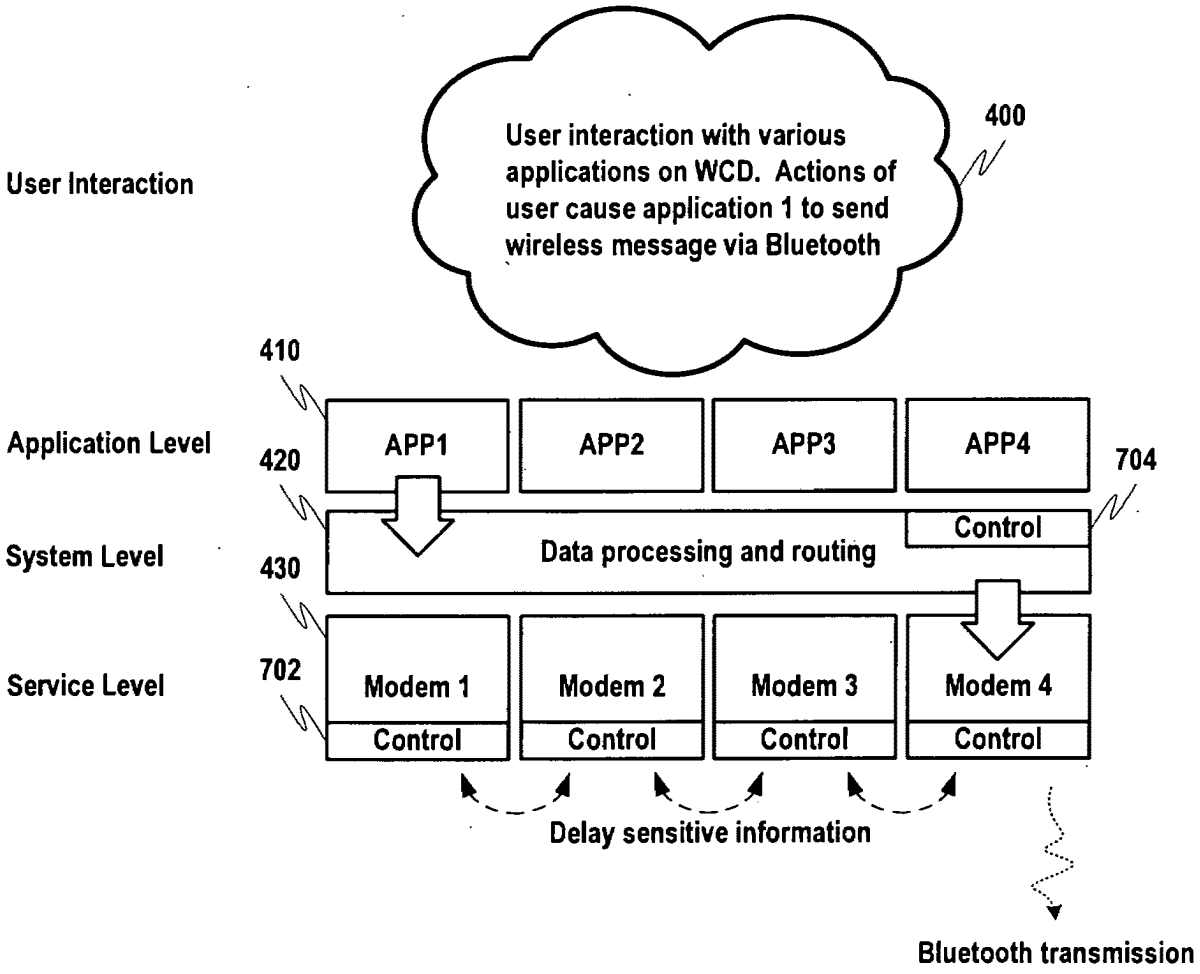

User Interaction
User interaction with various applications on WCD. Actions of user cause application 1 to send wireless message via Bluetooth
400
410
Application Level
APP1
APP2
APP3
APP4
420
704
System Level
Control
Data processing and routing
430
Service Level
702
Modem 1
Modem 2
Modem 3
Modem 4
Control
Control
Control
Control
Delay sensitive information
Bluetooth transmission

FIG. 9A

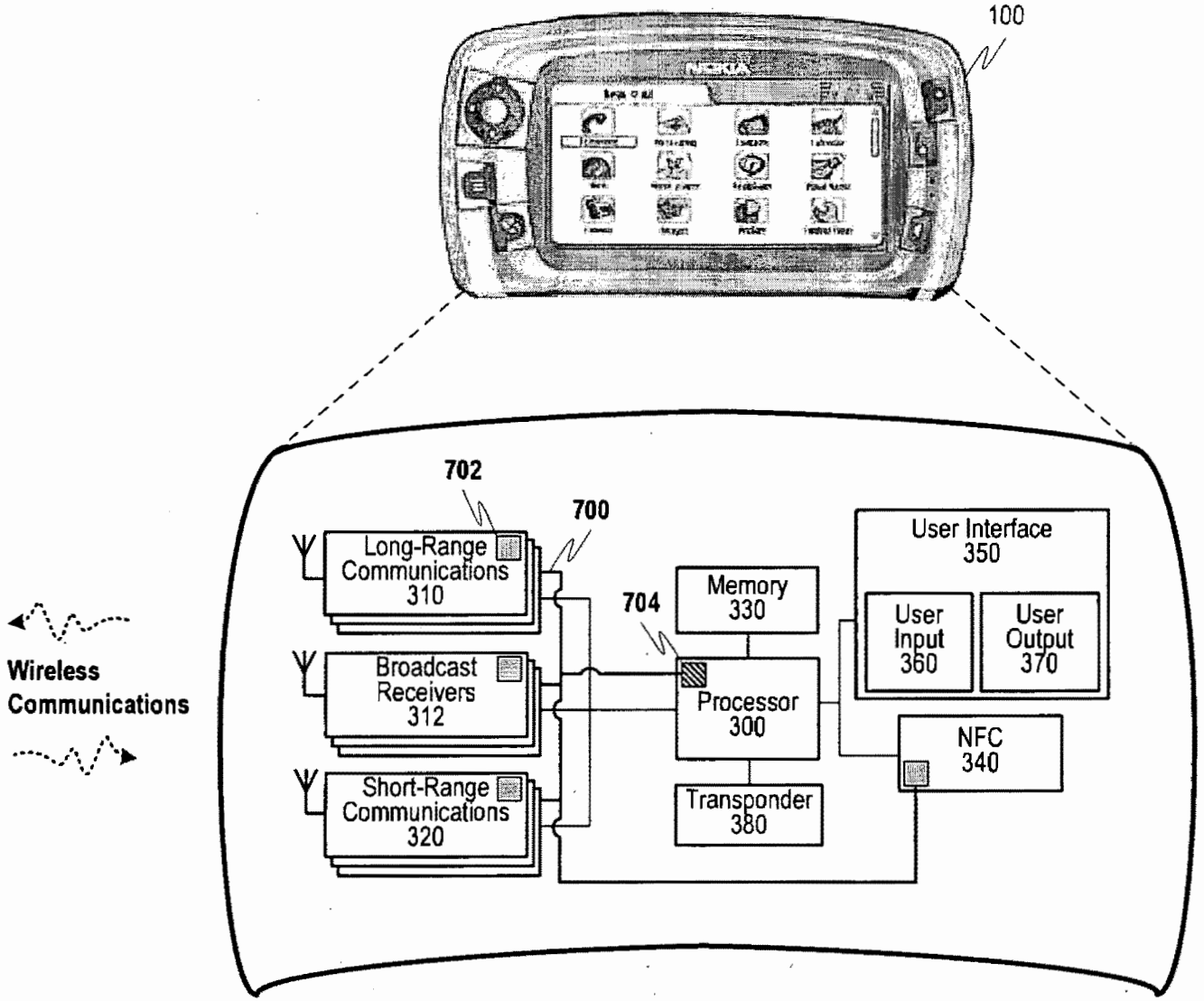

100
702
700
704
Long-Range Communications 310
Broadcast Receivers 312
Short-Range Communications 320
Memory 330
Processor 300
Transponder 380
User Interface 350
User Input 360
User Output 370
NFC 340
Wireless Communications

FIG. 9B

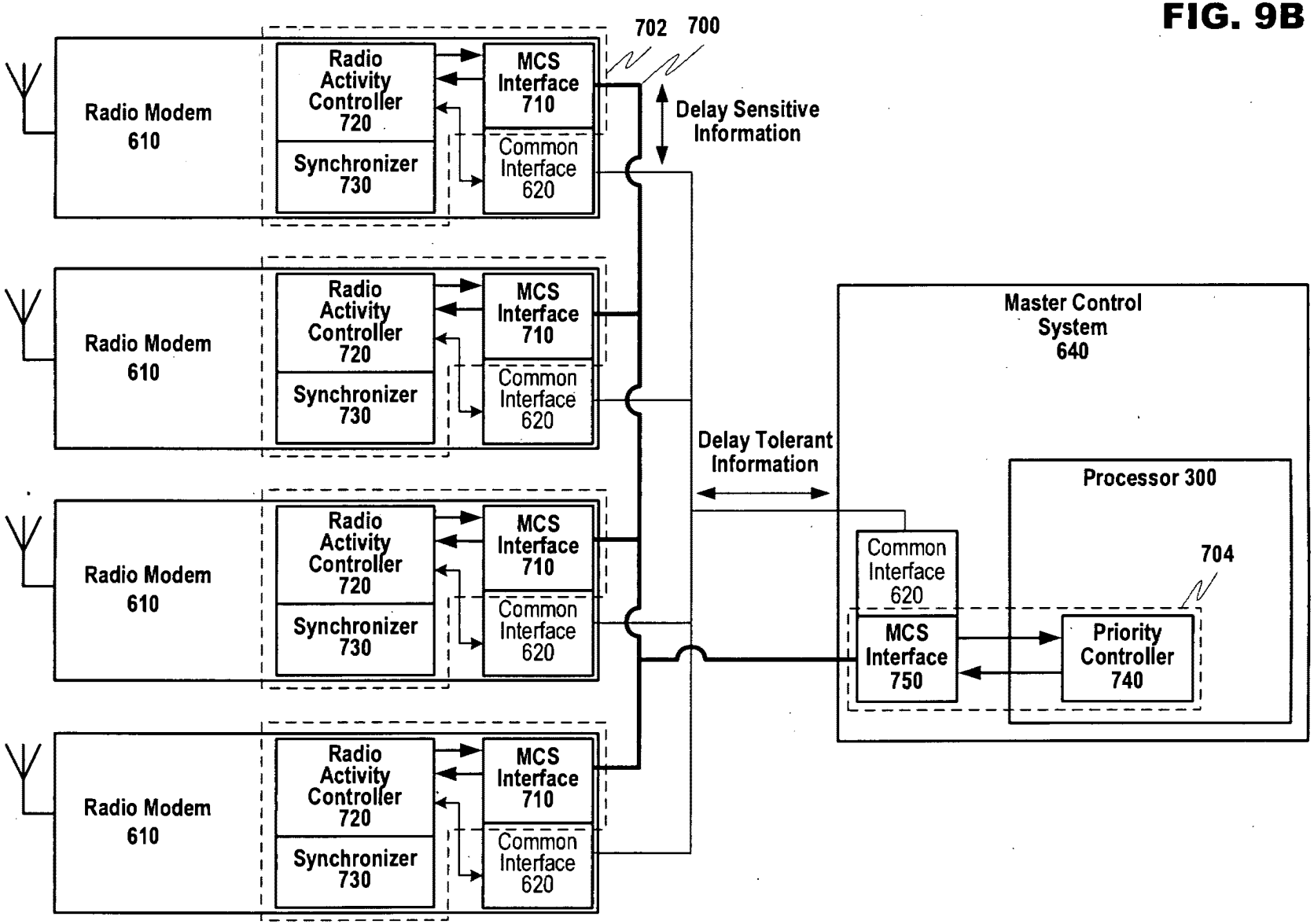


FIG. 9C

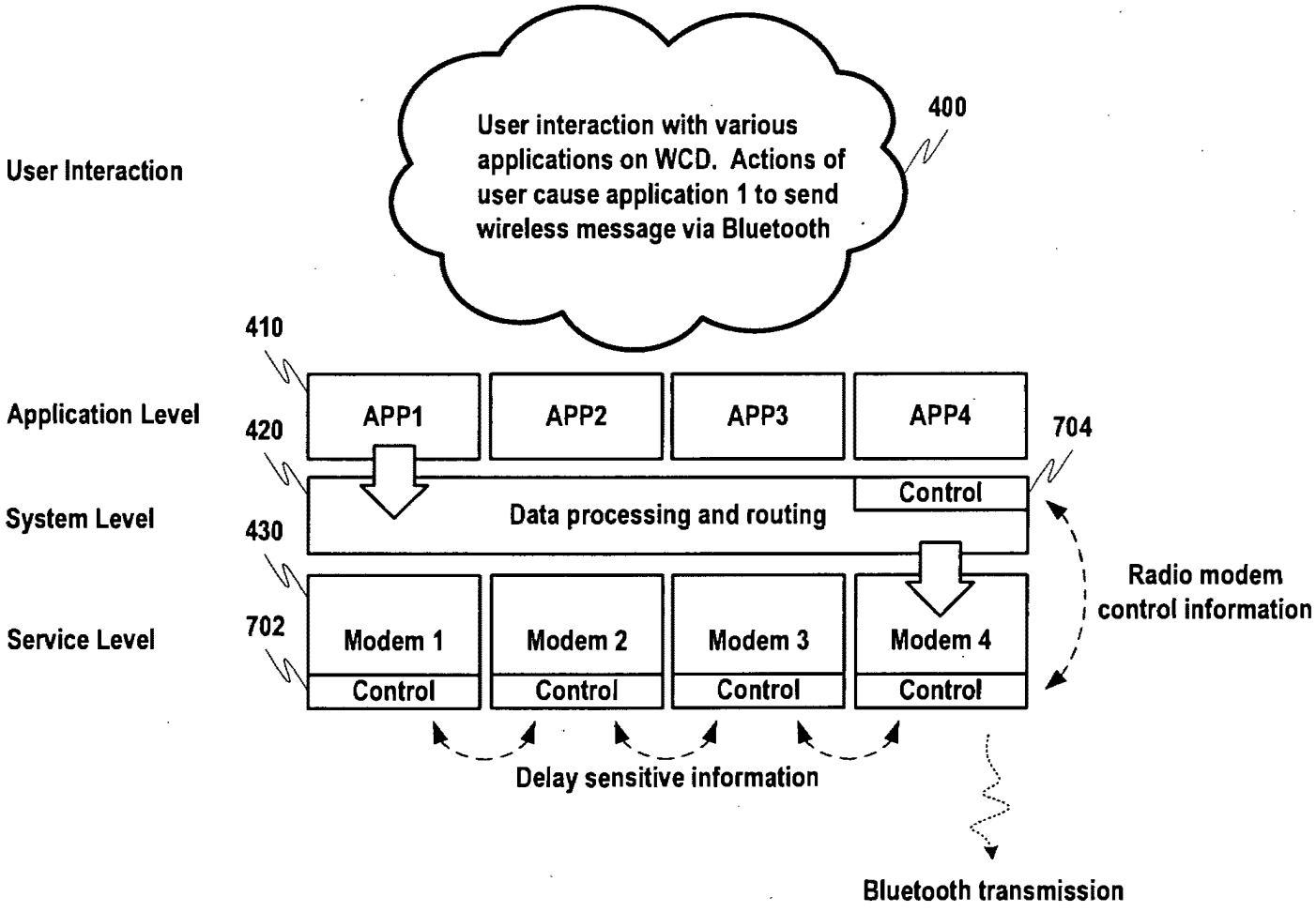

User Interaction
User interaction with various applications on WCD. Actions of user cause application 1 to send wireless message via Bluetooth
400
Application Level
410
APP1
APP2
APP3
APP4
420
704
System Level
Control
Data processing and routing
430
Service Level
Radio modem control information
702
Modem 1
Modem 2
Modem 3
Modem 4
Control
Control
Control
Control
Delay sensitive information
Bluetooth transmission

FIG. 10

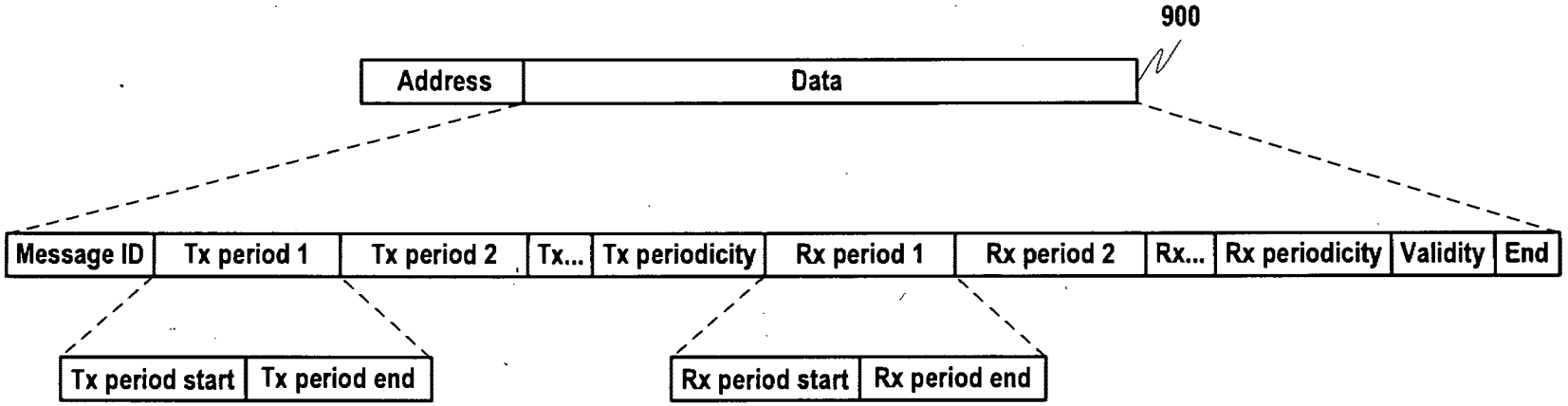

900
Address
Data
Message ID
Tx period 1
Tx period 2
Tx...
Tx periodicity
Rx period 1
Rx period 2
Rx...
Rx periodicity
Validity
End
Tx period start
Tx period end
Rx period start
Rx period end

FIG. 11

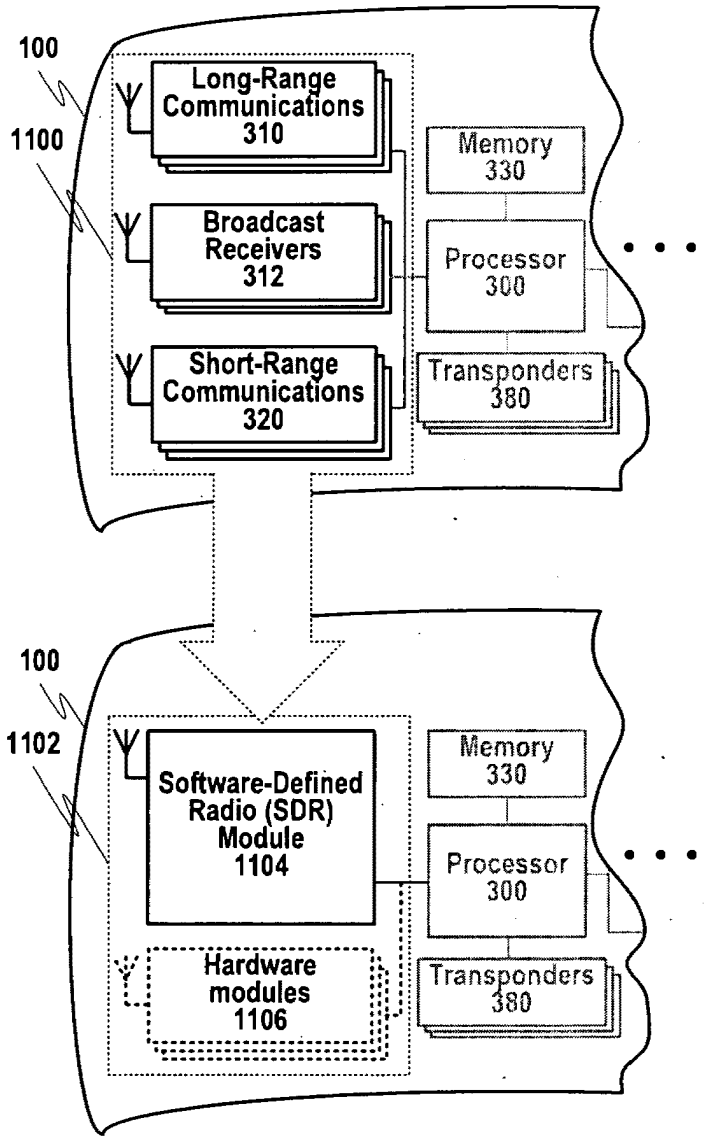

100
1100
Long-Range Communications 310
Broadcast Receivers 312
Short-Range Communications 320
Memory 330
Processor 300
Transponders 380
100
1102
Software-Defined Radio (SDR) Module 1104
Hardware modules 1106
Memory 330
Processor 300
Transponders 380

FIG. 12

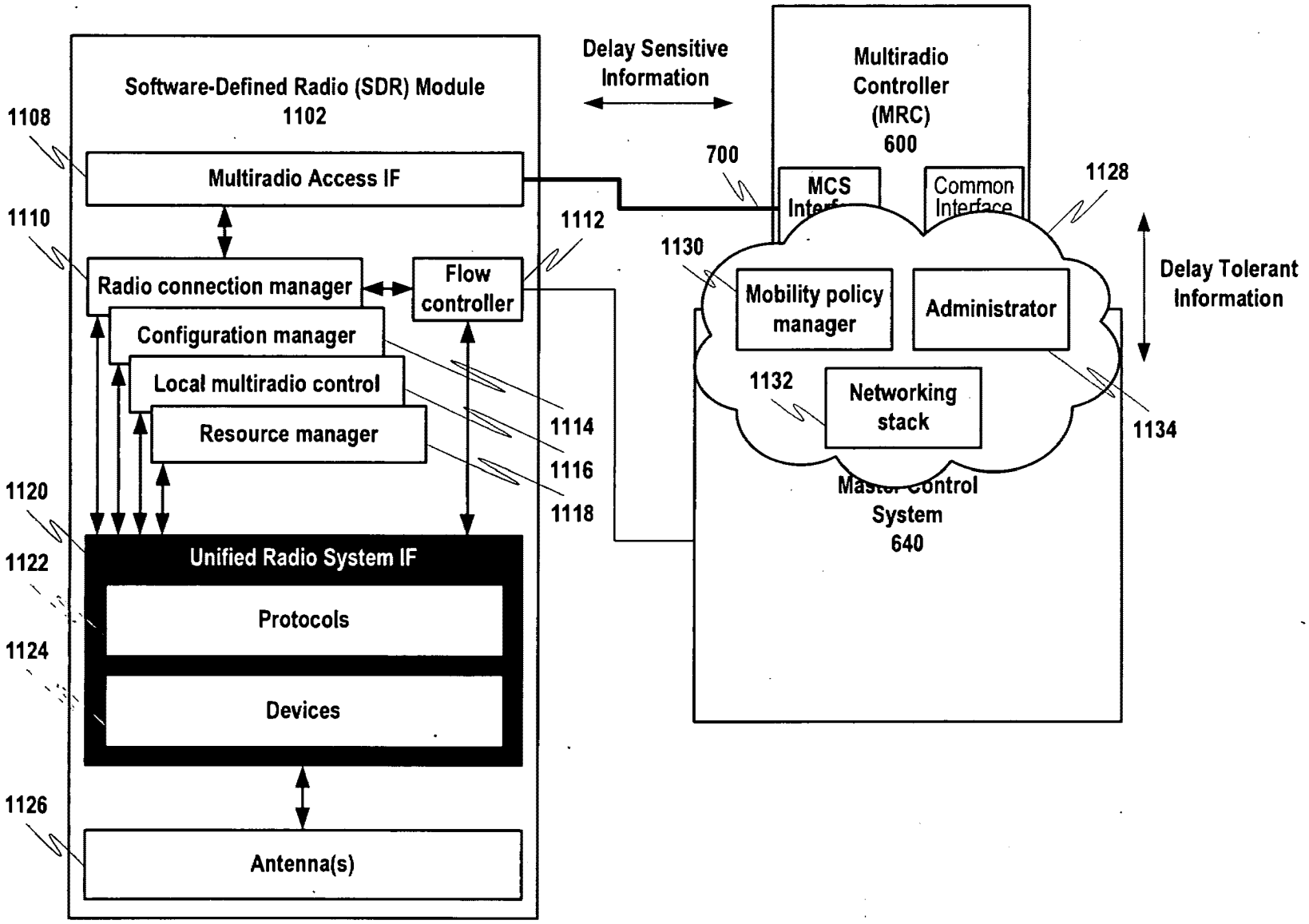


FIG. 13

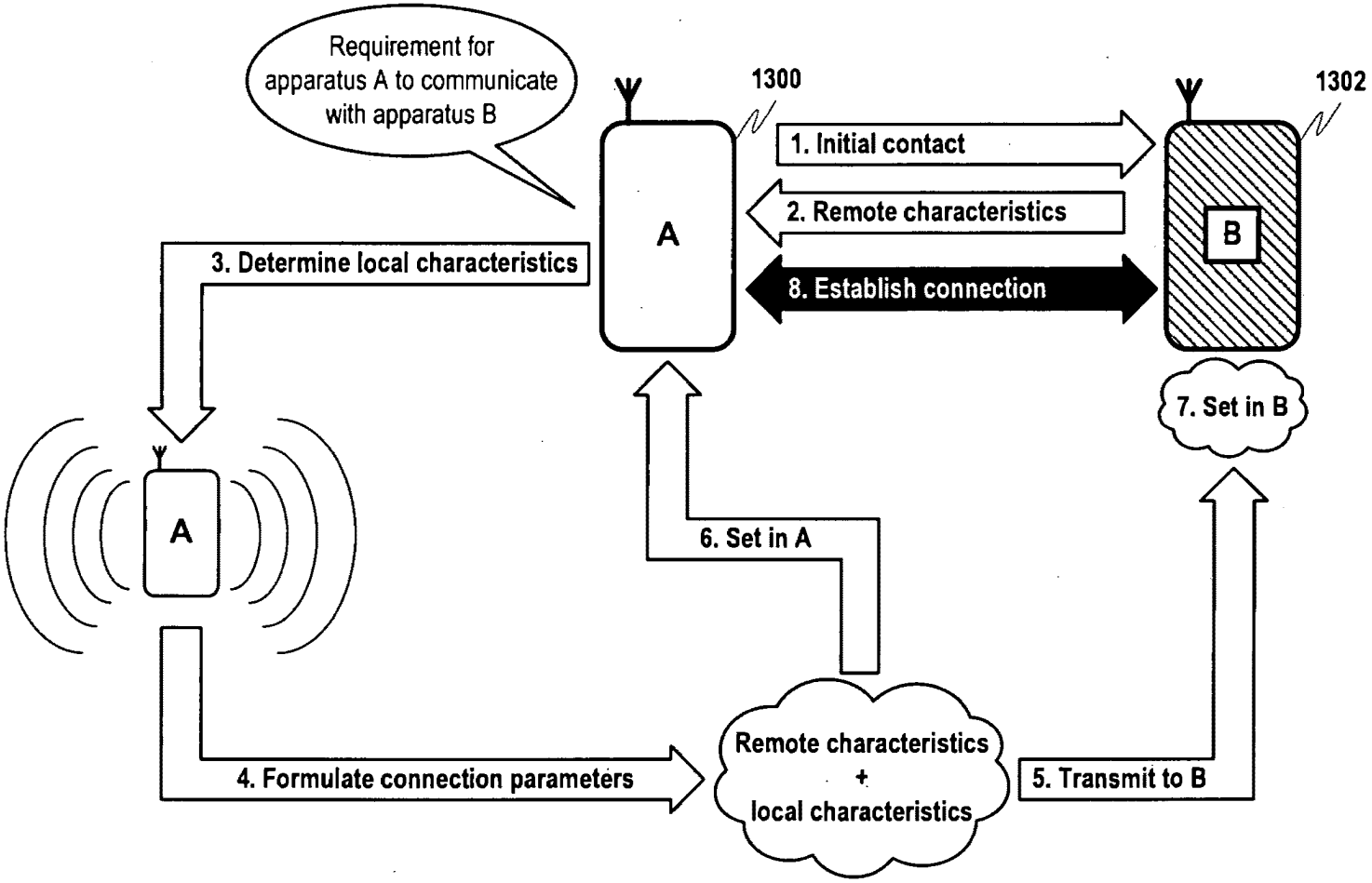

Requirement for apparatus A to communicate with apparatus B
1300
1302
A
B
1. Initial contact
2. Remote characteristics
8. Establish connection
3. Determine local characteristics
7. Set in B
A
6. Set in A
4. Formulate connection parameters
Remote characteristics + local characteristics
5. Transmit to B

FIG. 14A

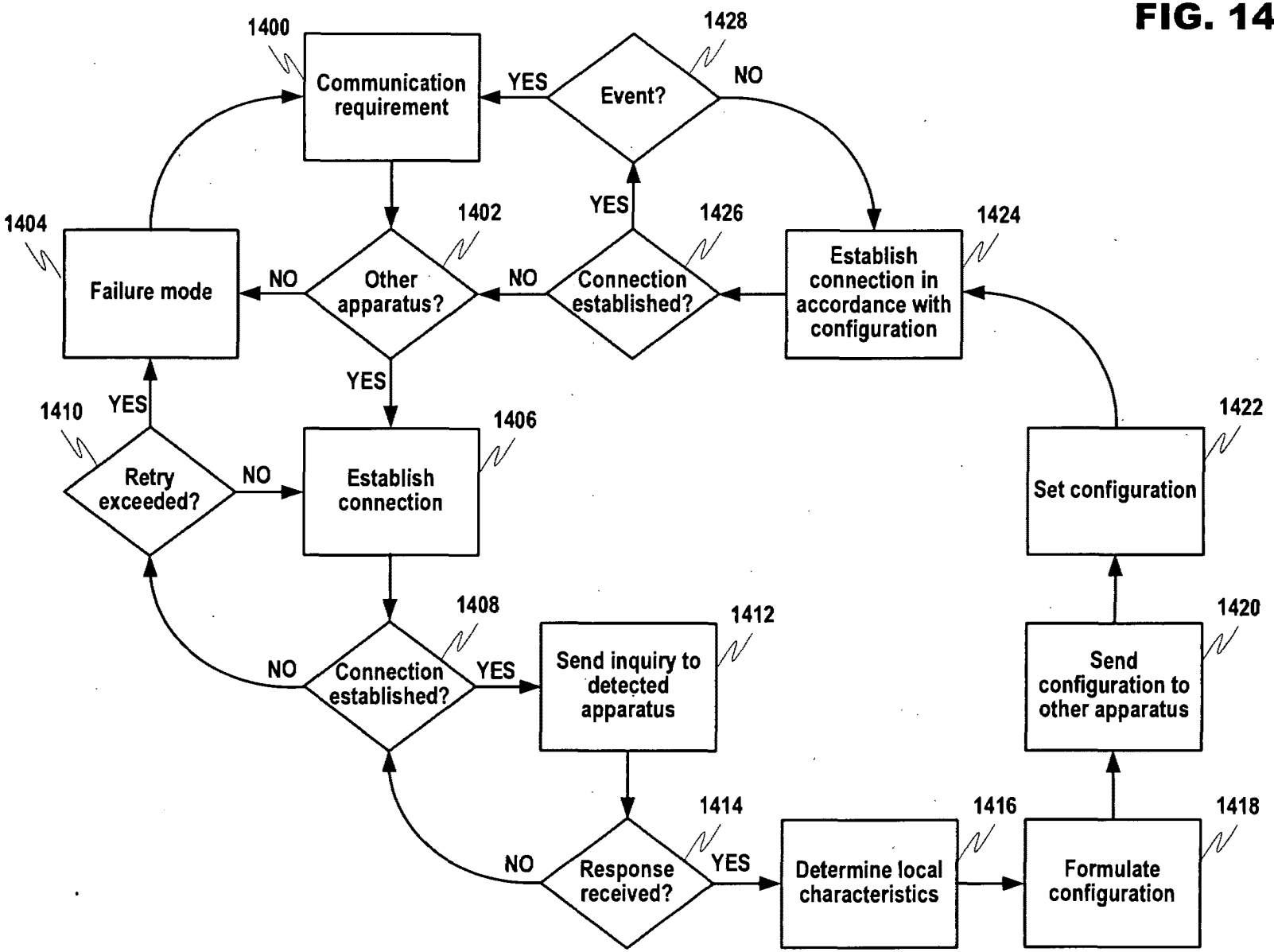
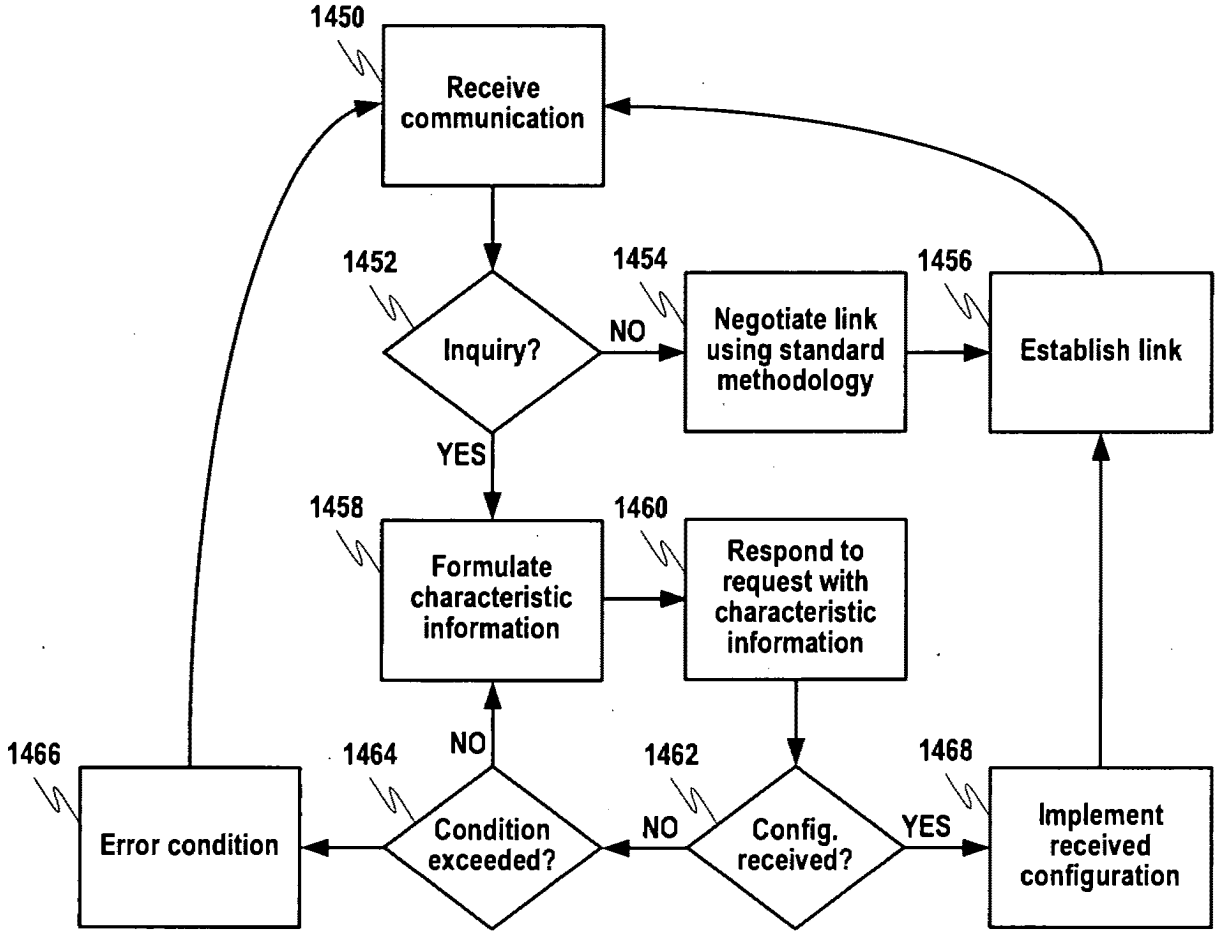

1400
Communication requirement
YES
1428
Event?
NO
1404
Failure mode
NO
1402
Other apparatus?
NO
YES
1426
Connection established?
YES
1424
Establish connection in accordance with configuration
YES
1410
Retry exceeded?
NO
1406
Establish connection
1422
Set configuration
NO
1408
Connection established?
YES
1412
Send inquiry to detected apparatus
1420
Send configuration to other apparatus
NO
1414
Response received?
YES
1416
Determine local characteristics
1418
Formulate configuration

FIG. 14B



Pertti Tolonen, SOFTWARE-DEFINED RADIO CONFIGURATION
Filed September 3, 2008, Morgan & Finnegan LLP, NY, NY

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Filing Date: **09/03/08**

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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number
12/203,746

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a),,(b), or (c))	N/A	N/A	N/A			N/A	310
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	510
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	210
TOTAL CLAIMS (37 CFR 1.16(i))	29 minus 20 =	9	X$ 25		OR	X$50	450
INDEPENDENT CLAIMS (37 CFR 1.16(h))	8 minus 3 =	* 5	X$105			X$210	1050
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $260 ($130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			185			370	
			TOTAL			TOTAL	2530

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/203,746	09/03/2008	Pertti TOLONEN	4208-4448

CONFIRMATION NO. 3717

27123
MORGAN & FINNEGAN, L.L.P.
3 WORLD FINANCIAL CENTER
NEW YORK, NY 10281-2101

FORMALITIES LETTER

OC000000032082212

Date Mailed: 09/19/2008

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**130** for a non-small entity, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $**130** for a non-small entity
- $**130** Surcharge.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/mkoroma/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/203,746	09/03/2008	2614	2530	4208-4448	29	8

CONFIRMATION NO. 3717

27123
MORGAN & FINNEGAN, L.L.P.
3 WORLD FINANCIAL CENTER
NEW YORK, NY 10281-2101

FILING RECEIPT

OC000000032082211

Date Mailed: 09/19/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Pertti TOLONEN, Vantaa, FINLAND;

Assignment For Published Patent Application

NOKIA CORPORATION, Espoo, FINLAND

Power of Attorney: None

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 09/15/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/203,746**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

SOFTWARE-DEFINED RADIO CONFIGURATION

Preliminary Class

379

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

Docket No. 4208-4448

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.:	12/203,746	Confirmation No.:	3717
Applicant(s):	Pertti TOLONEN	Group Art Unit:	2614
		Examiner:	UNASSIGNED
Filed:	September 3, 2008		
		Customer No.:	27123
For:	SOFTWARE DEFINED RADIO CONFIGURATION		

RESPONSE TO "NOTICE TO FILE MISSING PARTS"

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the NOTICE TO FILE MISSING PARTS OF APPLICATION--FILING DATE GRANTED dated September 19, 2008, Applicant(s) submit(s) herewith the following documents for appropriate action by the U.S. Patent and Trademark Office:

- ☐ Copy of Notice to File Missing Parts
- ☒ Executed Declaration
- ☐ Application Filing Fees
- ☐
- ☒ Please charge the required fee of $130.00 to deposit account no. **13-4500**, Order No. 4208-4448.
- ☐ A check in the amount of $_____ in payment of the application filing fees is attached.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required by this paper, or credit any overpayment to Deposit Account No. **13-4500**, Order No. 4208-4448. A DUPLICATE COPY OF THIS SHEET IS ATTACHED.

Respectfully submitted,
MORGAN & FINNEGAN, L.L.P.

Dated: November 19, 2008 By: _____
Elliot L. Frank
Registration No. 56,641

Correspondence Address:
Address Associated With Customer Number:
27123

(202) 857-7887 Telephone
(202) 857-7929 Facsimile

Docket No. 4208-4448

COMBINED DECLARATION AND POWER OF ATTORNEY FOR ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SOFTWARE-DEFINED RADIO CONFIGURATION

the specification of which

a. ☐ is attached hereto

b. ☒ was filed on September 3, 2008 as application Serial No. 12/203,746 and was amended on . (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

c. ☐ was described and claimed in International Application No. filed on and as amended on . (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. § 1.56.

I hereby specify the following as the correspondence address to which all communications about this application are to be directed:

SEND CORRESPONDENCE TO:

☒ The address associated with the Customer Number **27123**

-OR-

☐ Address Shown (see below)

DIRECT TELEPHONE CALLS TO:

Elliot L. Frank, Esq.

Docket No. 4208-4448

☐ I hereby claim foreign priority benefits under Title 35, United States Code § 119 (a)-(d) or under § 365(b) of any foreign application(s) for patent or inventor's certificate or under § 365(a) of any PCT international application(s) designating at least one country other than the U.S. listed below and also have identified below such foreign application(s) for patent or inventor's certificate or such PCT international application(s) filed by me on the same subject matter having a filing date within twelve (12) months before that of the application on which priority is claimed:

☐ The attached 35 U.S.C. § 119 claim for priority for the application(s) listed below forms a part of this declaration.

Country/PCT	Application Number	Date of filing (day, month, yr)	Date of issue (day, month, yr)	Priority Claimed
				☐ Y ☐ N
				☐ Y ☐ N
				☐ Y ☐ N

☐ I hereby claim the benefit under 35 U.S.C. § 119(e) of any U.S. provisional application(s) listed below.

Provisional Application No.	Date of filing (day, month, yr)

ADDITIONAL STATEMENTS FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART OR PCT APPLICATION(S) DESIGNATING THE U.S.

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s) or under § 365(c) of any PCT international application(s) designating the U.S. listed below.

US/PCT Application Serial No.	Filing Date	Status (patented, pending, abandoned)/ U.S. application no. assigned (For PCT)

US/PCT Application Serial No.	Filing Date	Status (patented, pending, abandoned)/ U.S. application no. assigned (For PCT)

☐ In this continuation-in-part application, insofar as the subject matter of any of the claims of this application is not disclosed in the above listed prior United States or PCT international application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

Docket No. 4208-4448

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or Imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint:

☒ Practitioners associated with the Customer Number **27123**

-OR-

☐ Practitioner(s) named below:

Name	Registration Number

☒ I hereby authorize the U.S. attorneys and/or agents named hereinabove to accept and follow instructions from a s to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and/or agents and me. In the event of a change in the person(s) from whom instructions may be taken I will so notify the U.S. attorneys and/or agents named hereinabove.

Full name of sole or first inventor: Pertti TOLONEN

Inventor's signature* _____ 6.11.2008 Date

Residence: Aatelikuja 1A

Citizenship: FI

Post Office Address: Aatelikuja 1A, Vantaa 01520 FI

Full name of second inventor: ____

Inventor's signature* _____ _____ Date

Residence: ____

Citizenship: ____

Post Office Address:

☐ ATTACHED IS ADDED PAGE TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR SIGNATURE BY THIRD AND SUBSEQUENT INVENTORS FORM.

Electronic Patent Application Fee Transmittal

Application Number:	12203746
Filing Date:	03-Sep-2008
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATION
First Named Inventor/Applicant Name:	Pertti TOLONEN
Filer:	Elliot Lyle Frank/Jacqueline Brooking
Attorney Docket Number:	4208-4448

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**130**

Electronic Acknowledgement Receipt

EFS ID:	4320785
Application Number:	12203746
International Application Number:	
Confirmation Number:	3717
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATION
First Named Inventor/Applicant Name:	Pertti TOLONEN
Customer Number:	27123
Filer:	Elliot Lyle Frank/Jacqueline Brooking
Filer Authorized By:	Elliot Lyle Frank
Attorney Docket Number:	4208-4448
Receipt Date:	19-NOV-2008
Filing Date:	03-SEP-2008
Time Stamp:	18:53:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$130
RAM confirmation Number	3939
Deposit Account	134500
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	4208-4448MSPRESP.pdf	42185 bf0cae83feecc62acf900712ed7cf0930b57e733	no	1
Warnings:					
Information:					
2	Oath or Declaration filed	4208-4448execDEC.pdf	129500 3fbb83ee47c571ff678f097bff8b2c4c8aca6887	no	3
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	30146 be8126f3345dca26ffb78cdc1eefdd3e8d42e89d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	201831		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/203,746	09/03/2008	2614	2660	4208-4448	29	8

CONFIRMATION NO. 3717

UPDATED FILING RECEIPT

27123
MORGAN & FINNEGAN, L.L.P.
3 WORLD FINANCIAL CENTER
NEW YORK, NY 10281-2101

OC000000033312878

Date Mailed: 11/28/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Pertti TOLONEN, Aatelikuja 1A, FINLAND;

Assignment For Published Patent Application

NOKIA CORPORATION, Espoo, FINLAND

Power of Attorney: The patent practitioners associated with Customer Number 27123

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 09/15/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/203,746**

Projected Publication Date: 03/04/2010

Non-Publication Request: No

Early Publication Request: No

Title

SOFTWARE-DEFINED RADIO CONFIGURATION

Preliminary Class

379

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/203,746		2617	

OC000000035252604

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 85775 on 03/30/2009

- **Correspondence Address**
- **Maintenance Fee Address**
- **Power of Attorney Address**

The address of record for Customer Number 85775 is:

85775
Locke Lord Bissell & Liddell LLP
Attn: IP Docketing
Three World Financial Center
New York, NY 10281-2101

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12203746
Filing Date	2008-09-03
First Named Inventor	Pertti TOLONEN
Art Unit	2614
Examiner Name	Unassigned
Attorney Docket Number	1004289.386US (4208-4448)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040023652	A1	2004-02-05	Shah et al.	
	2	20050053094	A1	2005-03-10	Cain et al.	
	3	20060073804	A1	2006-04-06	Tanaka et al.	
	4	20070263709	A1	2007-11-15	Kasslin et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12203746
Filing Date	2008-09-03
First Named Inventor	Pertti TOLONEN
Art Unit	2614
Examiner Name	Unassigned
Attorney Docket Number	1004289.386US (4208-4448)

	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	International Search Report for PCT/FI2009/050698 mailed December 4, 2009, 7pp.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12203746
Filing Date	2008-09-03
First Named Inventor	Pertti TOLONEN
Art Unit	2614
Examiner Name	Unassigned
Attorney Docket Number	1004289.386US (4208-4448)

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Elliot L. Frank/	Date (YYYY-MM-DD)	2009-12-14
Name/Print	Elliot L. Frank	Registration Number	56,641

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
NOKIA CORPORATION
IPR Department
Virpi Tognetty
Keilalahdentie 4
FI-02150 ESPOO
FINLAND

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 04 December 2009 (04.12.2009)
Applicant's or agent's file reference NC65164WO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/FI2009/050698	International filing date *(day/month/year)* 02 September 2009 (02.09.2009)
Applicant NOKIA CORPORATION et al.	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/FI National Board of Patents and Registration of Finland P.O. Box 1160, FI-00101 HELSINKI, Finland Facsimile No. +358 9 6939 5328	Authorized officer Pasi Suvikunnas Telephone No. +358 9 6939 500

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article," "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Volume I/A, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

What parts of the international application may be amended ?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

(i) the claim is unchanged;
(ii) the claim is cancelled;
(iii) the claim is new;
(iv) the claim replaces one or more claims as filed;
(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

If a demand for international preliminary examination is made, the written opinion of the International Searching Authority will, except in certain cases where the International Preliminary Examining Authority did not act as International Searching Authority and where it has notified the International Bureau under Rule 66.1*bis*(b), be considered to be a written opinion of the International Preliminary Examining Authority. If a demand is made, the applicant may submit to the International Preliminary Examining Authority a reply to the written opinion together, where appropriate, with amendments before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later (Rule 43*bis*.1(c)).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see the *PCT Applicant's Guide*, Volume II.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference NC65164WO	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/FI2009/050698	International filing date *(day/month/year)* 02 September 2009 (02.09.2009)	(Earliest) Priority Date *(day/month/year)* 03 September 2008 (03.09.2008)
Applicant NOKIA CORPORATION et al.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed.
      ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (see Box No. II).
3. ☐ **Unity of invention is lacking** (see Box No. III).
4. With regard to the **title**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the **drawings**,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 13
      ☐ as suggested by the applicant.
      ☒ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2009/050698

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04B, H04W, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007263709 A1 (KASSLIN M. et al.) 15 November 2007 (15.11.2007) abstract; paragraphs [0010] and [0011]	1-29
A	US 2005053094 A1 (CAIN J. B. et al.) 10 March 2005 (10.03.2005) abstract; paragraphs [0012]–[0021]	1-29
A	US 2004023652 A1 (SHAH Y. et al.) 05 February 2004 (05.02.2004) abstract; paragraphs [0017]–[0024]	1-29
A	US 2006073804 A1 (TANAKA H. et al.) 06 April 2006 (06.04.2006) abstract; paragraphs [0013] and [0014]	1-29

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
01 December 2009 (01.12.2009)	04 December 2009 (04.12.2009)

Name and mailing address of the ISA/FI	Authorized officer
National Board of Patents and Registration of Finland P.O. Box 1160, FI-00101 HELSINKI, Finland	Pasi Suvikunnas
Facsimile No. +358 9 6939 5328	Telephone No. +358 9 6939 500

Form PCT/ISA/210 (second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/FI2009/050698

Patent document cited in search report	Publication date	Patent family members(s)	Publication date
US 2007263709 A1	15/11/2007	CN 101444006 A	27/05/2009
		CA 2646905 A1	22/11/2007
		EP 2016682 A2	21/01/2009
		AU 2007251294 A1	22/11/2007
		WO 2007132319 A2	22/11/2007
US 2005053094 A1	10/03/2005	TW 248769B B	01/02/2006
		CN 1857013 A	01/11/2006
		KR 20060052999 A	19/05/2006
		EP 1665834 A1	07/06/2006
		CA 2538244 A1	24/03/2005
		WO 2005027543 A1	24/03/2005
US 2004023652 A1	05/02/2004	AT 431688T T	15/05/2009
		TW 269596B B	21/12/2006
		WO 2004012464 A2	05/02/2004
		EP 1527633 A2	04/05/2005
		AU 2003254245 A1	16/02/2004
US 2006073804 A1	06/04/2006	JP 2006108953 A	20/04/2006

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2009/050698

CLASSIFICATION OF SUBJECT MATTER

Int.Cl.
H04B 1/00 (2006.01)
H04W 72/04 (2009.01)

Electronic Acknowledgement Receipt

EFS ID:	6632520
Application Number:	12203746
International Application Number:	
Confirmation Number:	3717
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATION
First Named Inventor/Applicant Name:	Pertti TOLONEN
Customer Number:	85775
Filer:	Elliot Lyle Frank/Amy Triplett
Filer Authorized By:	Elliot Lyle Frank
Attorney Docket Number:	4208-4448
Receipt Date:	16-DEC-2009
Filing Date:	03-SEP-2008
Time Stamp:	11:21:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	42084448_Form__SB_08a.pdf	788126 36b6b1e0a8fa5ac888280ddc7d7f7c335e6c5a30	no	4

Warnings:	
Information:	

2	NPL Documents	42084448_NPL.pdf	104542 0a55c1772cc2881625a890a4c24e0ee8c3f4eaa1	no	7

Warnings:	
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Total Files Size (in bytes):	892668

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/203,746	09/03/2008	Pertti TOLONEN	4208-4448

CONFIRMATION NO. 3717

85775
Locke Lord Bissell & Liddell LLP
Attn: IP Docketing
Three World Financial Center
New York, NY 10281-2101

PUBLICATION NOTICE

OC000000040417722

Title:SOFTWARE-DEFINED RADIO CONFIGURATION

Publication No.US-2010-0056200-A1
Publication Date:03/04/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/203,746		2618	

OC000000046471868

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 10928 on 11/17/2010

- **Correspondence Address**
- **Power of Attorney Address**

The address of record for Customer Number 10928 is:

10928
Locke Lord Bissell & Liddell
IP Docket Department
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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/203,746		2618	

OC000000048332129

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 10928 on 12/28/2010

- **Correspondence Address**
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New York, NY 10281-2101

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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
12/203,746		2618	

OC000000046568713

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 10928 on 02/07/2011

- **Correspondence Address**
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10928
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/203,746	09/03/2008	Pertti TOLONEN	1004289.386US (4208-4448)	3717

10928 7590 08/15/2011

Locke Lord Bissell & Liddell
IP Docket Department
3 World Financial Center
New York, NY 10281-2101

EXAMINER	
NGUYEN, SIMON	
ART UNIT	**PAPER NUMBER**
2618	

NOTIFICATION DATE	DELIVERY MODE
08/15/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptopatentcommunication@lockelord.com
Shopkins@lockelord.com
Jmedina@lockelord.com

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12203746	TOLONEN, PERTTI
	Examiner	Art Unit
	SIMON NGUYEN	2618

SEARCHED			
Class	Subclass	Date	Examiner
455	517, 552.1-553.1, 556.1-556.2	8/3/11	SN

SEARCH NOTES		
Search Notes	Date	Examiner
EAST	8/3/11	SN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12203746	TOLONEN, PERTTI
	Examiner	**Art Unit**
	SIMON NGUYEN	2618

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	08/04/2011								
	1	✓								
	2	✓								
	3									
	4	✓								
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	6	✓								
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	26	✓								
	27	✓								
	28	✓								
	29	✓								

Office Action Summary	Application No.	Applicant(s)
	12/203,746	TOLONEN, PERTTI
	Examiner	Art Unit
	SIMON NGUYEN	2618

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-10,12-18 and 20-29* is/are rejected.

7)☒ Claim(s) *3,11 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 September 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)	
1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 4-10, 12-18, 20-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. (US 2008/0200195 A1) in view of Nasu et al. (US 2004/0266404 A1).

Regarding claim 1, Abe discloses a method for reconfiguring resources in a mobile communication system (abstract, fig.1-3), comprising: receiving (collecting) characteristic information into an apparatus (multimode control station 101) , wherein the collected or received characteristic information corresponding to at least one other apparatus (any intended wireless devices (for example, device 102 of 102-105, abstract, paragraphs 22-23, 25, 64, 77, 83, 84, 102, 149, 257-258); determining local characteristic information and formulating a configuration (reconfiguration) based on the collected characteristic information such as a resource allocation, a quality estimating, a communication link parameter, and a scheme selection (fig.2, paragraphs 76-88); sending (reporting) the configuration from the multimode control station 101 to the intended apparatus such as device 102 (figs. 1-3, paragraphs 23, 93, 199); implementing the configuration such that reconfiguration the resource allocation, the

communication link parameter, the scheme selection (paragraphs 76-88); and establishing communication between the multimode control station 101 with the intended wireless device 102 (figs. 1-3, paragraphs 14, 97). however, Abe failed to teach the multimode control station initially inquiries information from one of the other devices 102-105.

Nasu discloses a method for establishing a connection between a headset (2) or a wireless camera (5) to wireless devices 1a-1b (figs. 1a-c, 2a-2b) or printers 6a-c, respectively, the method comprising: the headset or camera initially inquires information about the wireless devices 1a-1b, the wireless devices sends the requested information, in response, to the headset; and based on the response, a communication link is established between the headset and one of the device 1a (abstract, paragraphs 16-21, 24-25, 105, 113, 114, 121-125). Therefore, it would have been obviously to one skilled in the art at the time the invention was made to have Abe, modified by Nasu by having the multimode control station 101 as taught by Abe to send an inquiry to any of other wireless devices prior to establish a communication.

Regarding claim 9, this claim is rejected for the same reason as set forth in claim 1, wherein a computer program for executing the method step is inherently in Abe.

Regarding claim 17, this claim is rejected for the same reason as set forth in claim 1 as apparatus of the method claim 1. Wherein Abe further discloses a reconfigurable digital signal processing section 10123 as a software-defined radio module and processing section 1016 as a processor for processing the control station (fig.2).

Regarding claim 25, this claim is rejected for the same reason as set forth in claim 1, as means of the method claim 1.

Regarding claims 2, 10, 18, Nasu discloses the headset as a source device sending out the inquiry signal (abstract, fig. 1a-c, 25), wherein the inquiry signal sent from the source to a destination device is considered as an initialization channel that is known to those skilled in the art.

Regarding claims 4, 12, 20, Abe further discloses the collected characteristic information and the local characteristic information comprise interference information (paragraphs 18-19, 23-24, 263, 265, 277, 279, 280-281, 283, 304), a power status (paragraphs 279-283, 318, 328, 335-336). However, Abe failed to teach the local characteristic information comprises load information. It should be noted that the local characteristic information including a load information in the apparatus in the determination to establish a connection is known to those skilled in the art.

Regarding claims 5, 13, 21, Abe discloses the establishing of the connection via a wireless transport based on the collected information received by the wireless devices (102-105) and the local information in the apparatus 101 such as the scheme selection, the resource allocation, a QoS parameter (figs. 1-3, abstract, paragraphs 76-88).

Regarding claims 6-7, 14-15, 22-23, Abe discloses the configuration is reported or sent to other devices (102-105) (figs. 1-3, paragraphs 23, 93, 199), wherein the report of the configuration sent in an initialization channel is known to those skilled in the art.

It should be noted that Abe discloses the multimode control station 101 communication to different devices 102-105 based on a request connection from the devices 102-105, which means that the multimode control station can connect or disconnect from these devices which is known to those skilled in the art. It is also noted that prior to establish a connection to transmit/receive data or voice, the two communication devices use an initialization channel to commute which is also known to those skilled in the art.

Regarding claims 8, 16, 24, Abe discloses that prior to establish the communication between a multimode control station 101 to one of devices 102-105 for transmitting/receiving data and voice on a traffic channel, Abe discloses the collecting information from one of the devices, wherein the collecting information is performed on different channel than the traffic channel which is known to those skilled in the art.

Regarding claim 26, this claim is rejected for the same reason as set forth in claim 1 but in a reverse position, wherein an apparatus is a multimode terminal station 102 (fig.3), comprising: receiving wireless communication in the multimode terminal station; determining characteristic information in the multimode terminal station; receiving (by reporting) a reconfiguration from multimode control station; implementing the configuration by reconfiguration DSP section 10223; and establishing communication in accordance with the configuration (figs. 1-3, paragraphs 65-66, 69, 91-99, 110, 119, 129, 185-187, 319, 324, 341), wherein Abe further discloses a request for connection between the multimode terminal station and the multimode control station (paragraphs 199, 289, 313). However, Abe fails to teach receiving an inquiry.

Nasu discloses a method for establishing a connection between wireless devices 1a-1b (figs. 1a-c, 2a-2b) and a headset, wherein the wireless devices receive an inquiry from the headset, the wireless devices sends the required information, in response, to the headset; and based on the response, a communication link is established between the headset and one of the device 1a (abstract, paragraphs 16-21, 24-25, 105, 113, 114, 121-125). Therefore, it would have been obviously to one skilled in the art at the time the invention was made to have Abe, modified by Nasu by having the multimode control station 101 as taught by Abe to send an inquiry to any of other wireless devices prior to establish a communication.

Regarding claims 28-29, these claims are rejected for the same reason as set forth in claim 26 as means and apparatus of method claim 26.

Regarding claim 27, this claim is rejected for the same reason as set forth in claim 26, wherein a computer program for executing the method step is inherently in the systems of Abe and Nasu.

Allowable Subject Matter

3. Claims 3, 11, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 3, 11, 19, Abe further discloses the collected characteristic information and the local characteristic information comprise interference information (paragraphs 18-19, 23-24, 263, 265, 277, 279, 280-281, 283, 304), a power status

(paragraphs 279-283, 318, 328, 335-336). However, Abe failed to teach the collected characteristic information comprises load information.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Simon Nguyen whose telephone number is (571) 272-7894. The examiner can normally be reached on Monday-Friday from 7:00 AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc M. Nguyen can be reached on (571) 272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

August 4, 2011

/SIMON D NGUYEN/

Primary Examiner, Art Unit 2618

Notice of References Cited	Application/Control No. 12/203,746	Applicant(s)/Patent Under Reexamination TOLONEN, PERTTI	
	Examiner SIMON NGUYEN	Art Unit 2618	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2008/0200195	08-2008	Abe et al.	455/501
*	B	US-2004/0266404	12-2004	Nasu et al.	455/414.1
*	C	US-2007/0190938	08-2007	Hillyard, Jason	455/041.1
*	D	US-2008/0261605	10-2008	Larsen, James David	455/446
*	E	US-2005/0094589	05-2005	Camp, William O. JR.	370/318
*	F	US-2007/0115950	05-2007	Karaoguz et al.	370/356
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12203746
Filing Date	2008-09-03
First Named Inventor	Pertti TOLONEN
Art Unit	2614
Examiner Name	Unassigned
Attorney Docket Number	1004289.386US (4208-4448)

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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/SN/	1	20040023652	A1	2004-02-05	Shah et al.	
/SN/	2	20050053094	A1	2005-03-10	Cain et al.	
/SN/	3	20060073804	A1	2006-04-06	Tanaka et al.	
/SN/	4	20070263709	A1	2007-11-15	Kasslin et al.	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12203746
Filing Date	2008-09-03
First Named Inventor	Pertti TOLONEN
Art Unit	2614
Examiner Name	Unassigned
Attorney Docket Number	1004289.386US (4208-4448)

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/SN/	1	International Search Report for PCT/FI2009/050698 mailed December 4, 2009, 7pp.	☐

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EXAMINER SIGNATURE

Examiner Signature	/Simon Nguyen/	Date Considered	06/24/2011

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4	("20080200195" or "20080261605" or "20040266404" or "20070190938").pn.	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:13
L2	2	1 and inquir$3	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:18
L3	2	2 and (configuration or configur$3)	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:18
L4	2933	inquir$3 same (establish$3 near7 (link or communicat$3 or connect$3))	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:26
L5	2210	4 and (configur$3 or configuration or reconfigur$3 or reconfiguration)	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:27
L6	172	5 and (multimode or ((multi$3 or plurality) adj2 (mode or system)))	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:28
L7	74	6 and ((receiv$3 or transmit$4 or report$3 or send$3) near7 (configur$3 or configuration))	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L8	145729	"455"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L9	21	7 and 8	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L10	155139	"370"/$.ccls.	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L11	22	7 and 10	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L12	68757	9 ro 11	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L13	36	9 or 11	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:29
L14	36	13 and inquir$3	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:33
L15	297	4 same (configur$3 or configuration or reconfigur$3 or reconfiguration)	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:50
L16	105	15 same ((receiv$3 or transmit$4 or report$3 or send$3) near7 (configur$3 or	US-PGPUB;	OR	OFF	2011/08/03 17:50

		configuration))	USPAT			
L17	45	16 and (8 or 10)	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:51
L18	42	17 not 13	US-PGPUB; USPAT	OR	OFF	2011/08/03 17:51

8/3/2011 6:17:49 PM

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	11/707584	US-PGPUB; USPAT	OR	ON	2011/08/01 14:20
L2	7	("20060135067" or "7860516" or "20050181808" or "7263367" or "6556825" or "20050221841" or "20070032225").pn.	US-PGPUB; USPAT	OR	ON	2011/08/01 14:25
L3	24	("20020054097" | "20020082022" | "20020119788" | "20020143930" | "20020145984" | "20040010404" | "20050064856" | "20050064877" | "20050114800" | "20050181808" | "20050203757" | "20050221841" | "20060089792" | "20060107219" | "20060135067" | "20060154605" | "20060258368" | "6415220" | "6484029" | "6539230" | "6750813" | "6879838" | "6931130" | "6963749").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2011/08/01 14:46
L4	210	inquir$3 and SDR	US-PGPUB; USPAT; USOCR	OR	OFF	2011/08/01 15:09
L5	232	inquir$3 and SDR	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:10
L6	152	5 and (receiv$3 near7 information)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:10
L7	144	6 and (adjust$3 or (configur$3 or configuration))	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:11

L8	158519	"455"/$.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:11
L9	15	7 and 8	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:11
L10	16	7 and (short adj2 range)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:19
L11	6492	initia$4 with inquir$3	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:27
L12	19	11 and SDR	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:27
L13	177744	initia$4 with (requirement or inquir $3 or request$4)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:29
L14	622	13 and SDR	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:29
L15	49	14 and ((long adj2 range) same (short adj2 range))	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:30
L16	41	15 not (10 or 12)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:30
L17	3	8 and 16	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:30
L18	159350	"370"/$.ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:31
L19	8	16 and 18	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:31
L20	82	((configur$3 or configuration) with resource) same SDR	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:33
L21	27	20 and (receiv$3 with information)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 15:34
L22	8	1 or 2	US-PGPUB; USPAT	OR	ON	2011/08/01 15:39
L23	5	22 and (request$3 or inquir$3)	US-PGPUB; USPAT	OR	ON	2011/08/01 15:39

L24	3	23 and ((local or area) near6 information)	US-PGPUB; USPAT	OR	ON	2011/08/01 15:40
L25	6	22 and (request$3 or inquir$3 or acquir$3)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:27
L26	1	25 not 23	US-PGPUB; USPAT	OR	ON	2011/08/01 16:27
L27	163	((configur$3 or configuration) with resource) with (characteristic near5 information)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:30
L28	3	27 and SDR	US-PGPUB; USPAT	OR	ON	2011/08/01 16:31
L29	26	27 and ((local or area or region) near7 information)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:31
L30	359472	(request$3 or inquir$3 or acquir$3) near7 information	US-PGPUB; USPAT	OR	ON	2011/08/01 16:40
L31	10754	30 same (establish$3 near7 (link or connect $3))	US-PGPUB; USPAT	OR	ON	2011/08/01 16:41
L32	23191	30 with (initial$3 or initiat$3)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:42
L33	1761	31 and 32	US-PGPUB; USPAT	OR	ON	2011/08/01 16:42
L34	788	33 and ((local or area or region) near7 information)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:42
L35	157	8 and 34	US-PGPUB; USPAT	OR	ON	2011/08/01 16:42
L36	54	33 and (power near3 status)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:43
L37	1	36 and (interference near3 information)	US-PGPUB; USPAT	OR	ON	2011/08/01 16:44
L38	36	36 and ((configur$3 or configuration) with resource)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 16:53
L39	875	(establish$3 near3 (link or connect$3)) same ((configur$3 or configuration) with resource)	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 16:55
L40	70	32 and 39	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 16:56

L41	20	40 and (power near7 (information or status))	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 16:57
L42	1696	((interference or interfer $3) near5 information) same (power near7 (information or status))	US-PGPUB; USPAT; USOCR	OR	ON	2011/08/01 16:59
L43	5	42 same (establish$3 near7 (link or connect $3))	US-PGPUB; USPAT	OR	ON	2011/08/01 16:59
L44	368	42 and (establish$3 near7 (link or connect $3))	US-PGPUB; USPAT	OR	ON	2011/08/01 17:01
L45	67	44 and 13	US-PGPUB; USPAT	OR	ON	2011/08/01 17:01
L46	31	45 and 18	US-PGPUB; USPAT	OR	ON	2011/08/01 17:01
L47	8	45 and (((configur$3 or configuration) with resource) with information)	US-PGPUB; USPAT	OR	ON	2011/08/01 17:02
L48	33	44 and (((configur$3 or configuration) with resource) with information)	US-PGPUB; USPAT	OR	ON	2011/08/01 17:03
L49	31	48 and (8 or 18)	US-PGPUB; USPAT	OR	ON	2011/08/01 17:03
L50	20	49 and ((request$3 or inquir$3) near7 information)	US-PGPUB; USPAT	OR	ON	2011/08/01 17:10

EAST Search History (Interference)

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	276605	establish$3 adj4 (connection or communication or link)	US-PGPUB; USPAT	OR	ON	2011/07/13 13:27
L2	20345	1.ab.	US-PGPUB; USPAT	OR	ON	2011/07/13 13:28
L3	277	2 and ((local or area or region) near7 (rul $3 or law or regulat $3))	US-PGPUB; USPAT	OR	ON	2011/07/13 13:29
L4	144872	"455"/$.ccls.	US-PGPUB; USPAT	OR	ON	2011/07/13 13:29
L5	46	3 and 4	US-PGPUB; USPAT	OR	ON	2011/07/13 13:29
L6	3893	1 same ((local or area or region) near7 (rul$3 or law or regulat$3 or information))	US-PGPUB; USPAT	OR	ON	2011/07/13 13:41
L7	157	6 and (information same power same load)	US-PGPUB; USPAT	OR	ON	2011/07/13 13:42
L8	40	4 and 7	US-PGPUB; USPAT	OR	ON	2011/07/13 13:42
L9	40	8 not 5	US-PGPUB; USPAT	OR	ON	2011/07/13 13:42
L10	44	7 and (initia$4 with (request$3 or inquir $3))	US-PGPUB; USPAT	OR	ON	2011/07/13 13:47
L11	1117	6 and (initia$4 with (request$3 or inquir $3))	US-PGPUB; USPAT	OR	ON	2011/07/13 13:51
L12	212	4 and 11	US-PGPUB; USPAT	OR	ON	2011/07/13 13:52

L13	13	12 and (((local or area or region) near7 (rul$3 or law or regulat$3 or information)) with power)	US-PGPUB; USPAT	OR	ON	2011/07/13 13:53
L14	8996	(receiv$3 adj7 information) same (initia$4 with (request $3 or inquir$3))	US-PGPUB; USPAT	OR	ON	2011/07/13 13:59
L15	3450	1 and 14	US-PGPUB; USPAT	OR	ON	2011/07/13 13:59
L16	17	15 and (((local or area or region) near7 (rul$3 or law or regulat$3 or information)) with power)	US-PGPUB; USPAT	OR	ON	2011/07/13 14:00
L17	35	14 and (((local or area or region) near7 (rul$3 or law or regulat$3 or information)) with power)	US-PGPUB; USPAT	OR	ON	2011/07/13 14:04
L18	18	17 not 16	US-PGPUB; USPAT	OR	ON	2011/07/13 14:04
L19	18	18 not 13	US-PGPUB; USPAT	OR	ON	2011/07/13 14:04
L20	18	19 not 5	US-PGPUB; USPAT	OR	ON	2011/07/13 14:04

EAST Search History (Interference)

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EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L7	17253	(software near3 defined)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:39
L8	204	7 and (inquir$3 with connect$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:40
L9	76	8 and (power near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:40
L10	71	9 and (interference near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:40
L11	71	10 and (alter$3 or adjust$3 or chang $3 or configuration or configur$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:41
L12	144128	"455"/$.ccls.	US-PGPUB; USPAT	OR	ON	2011/06/24 14:41
L13	1	12 and 11	US-PGPUB; USPAT	OR	ON	2011/06/24 14:41
L14	153080	"370"/$.ccls.	US-PGPUB; USPAT	OR	ON	2011/06/24 14:42
L15	0	11 and 14	US-PGPUB; USPAT	OR	ON	2011/06/24 14:42
L16	71	11 and ((location or local) near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:44
L17	1	11 and (determin$3 with ((location or local) near7 information))	US-PGPUB; USPAT	OR	ON	2011/06/24 14:44
L18	10	8 and (determin$3 with ((location or local) near7 information))	US-PGPUB; USPAT	OR	ON	2011/06/24 14:45

L19	10	18 and (alter$3 or adjust$3 or chang $3 or configuration or configur$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:45
L20	8410	(inquir$3 with connect$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:50
L21	818	20 and (power near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:50
L22	99	21 and (interference near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:51
L23	90	22 and ((location or local) near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:51
L24	90	23 and (alter$3 or adjust$3 or chang $3 or configuration or configur$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:51
L25	84	24 and load	US-PGPUB; USPAT	OR	ON	2011/06/24 14:51
L26	13	12 and 25	US-PGPUB; USPAT	OR	ON	2011/06/24 14:51
L27	0	25 and (estabish$3 near7 (connect$3 or communicat$3 or link))	US-PGPUB; USPAT	OR	ON	2011/06/24 14:54
L28	84	25 and (establish$3 near7 (connect$3 or communicat$3 or link))	US-PGPUB; USPAT	OR	ON	2011/06/24 14:55
L29	13	12 and 28	US-PGPUB; USPAT	OR	ON	2011/06/24 14:55
L30	2	14 and 28	US-PGPUB; USPAT	OR	ON	2011/06/24 14:57
L31	73047	((inquir$3 or request $3) near7 information) with (connect$3 or communicat$3 or link)	US-PGPUB; USPAT	OR	ON	2011/06/24 14:59

L32	7398	31 and (determin$3 with ((location or local) near7 information))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:00
L33	3552	32 and (establish$3 near7 (connect$3 or communicat$3 or link))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:00
L34	2461	33 and ((alter$3 or adjust$3 or chang $3 or configuration or configur$3) with (local or location or area or region))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:01
L35	240	34 and (power same interference)	US-PGPUB; USPAT	OR	ON	2011/06/24 15:02
L36	45	12 and 35	US-PGPUB; USPAT	OR	ON	2011/06/24 15:02
L37	13	34 and (power same interference same ((stat$3 or feedback) near3 information))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:04
L38	186176	(alter$3 or chang$3 or adjust$3 or reconfigur$3 or modif$4) with (device or unit or terminal or apparatus or station) with (location or area or region)	US-PGPUB; USPAT	OR	ON	2011/06/24 15:09
L39	77803	38 and (determin$3 with (location or area or local or region))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:10
L40	10101	39 and (establish$3 near7 (connect$3 or communicat$3 or link))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:11
L41	1704	40 and (receiv$3 with (stat$3 near3 information))	US-PGPUB; USPAT	OR	ON	2011/06/24 15:12

L42	331	41 and (power same interference)	US-PGPUB; USPAT	OR	ON	2011/06/24 15:13
L43	170	12 and 42	US-PGPUB; USPAT	OR	ON	2011/06/24 15:13
L44	86	43 and load	US-PGPUB; USPAT	OR	ON	2011/06/24 15:13

EAST Search History (Interference)

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BIB DATA SHEET

CONFIRMATION NO. 3717

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/203,746	09/03/2008	455	2618	1004289.386US (4208-4448)

APPLICANTS
Pertti TOLONEN, Aatelikuja 1A, FINLAND;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
09/15/2008

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /SIMON NGUYEN/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		FINLAND	23	29	8

ADDRESS

Locke Lord Bissell & Liddell
IP Docket Department
3 World Financial Center
New York, NY 10281-2101
UNITED STATES

TITLE

SOFTWARE-DEFINED RADIO CONFIGURATION

FILING FEE RECEIVED		
2660	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	291662	establish$3 near4 (communicat$3 or connect$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 08:29
L2	22641	1.ab.	US-PGPUB; USPAT	OR	ON	2011/06/24 08:29
L3	12423	2 and (inquiry or request$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 08:30
L4	7547	3 and (receiv$3 near7 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 08:30
L5	9436	3 and (receiv$3 near7 (respon$4 or information))	US-PGPUB; USPAT	OR	ON	2011/06/24 08:30
L6	53	5 and ((power near3 (stat$3 or information)) same interference)	US-PGPUB; USPAT	OR	ON	2011/06/24 08:32
L7	1	12/203746	US-PGPUB; USPAT	OR	ON	2011/06/24 08:32
L8	376441	establish$3 near7 (communicat$3 or connect$3 or link$3)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:14
L9	54868	8 and ((inquiry or request$3) with (initial$3 or initiat$3 or initialization))	US-PGPUB; USPAT	OR	ON	2011/06/24 09:15
L10	45675	9 and (receiv$3 near7 (respon$4 or information))	US-PGPUB; USPAT	OR	ON	2011/06/24 09:15
L11	118	10 and (power same interference same load)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:17
L12	118	11 not 6	US-PGPUB; USPAT	OR	ON	2011/06/24 09:17

L13	10	12 and (software near5 (defined or reconfigura$4 or configura$4))	US-PGPUB; USPAT	OR	ON	2011/06/24 09:18
L14	144128	"455"/$.ccls.	US-PGPUB; USPAT	OR	ON	2011/06/24 09:24
L15	153080	"370"/$.ccls.	US-PGPUB; USPAT	OR	ON	2011/06/24 09:24
L16	109	12 and (14 or 15)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:24
L17	0	16 and (wlan same bluetooth)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:24
L18	5339	10 and (software near5 (defined or reconfigura$4 or configura$4))	US-PGPUB; USPAT	OR	ON	2011/06/24 09:25
L19	100	18 and (wlan same bluetooth)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:26
L20	54	19 and (14 or 15)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:26
L21	54	20 not (13 or 6)	US-PGPUB; USPAT	OR	ON	2011/06/24 09:26
L22	9681	8 same ((inquiry or request$3) with (initial$3 or initiat$3 or initialization))	US-PGPUB; USPAT	OR	ON	2011/06/24 10:05
L23	8122	22 and (receiv$3 near7 (respon$4 or information))	US-PGPUB; USPAT	OR	ON	2011/06/24 10:05
L24	4633	23 and ((adjust$3 or alter$3 or chang $3 or configurat$3 or configur$3) with information)	US-PGPUB; USPAT	OR	ON	2011/06/24 10:07
L25	70	11 and (power near3 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 10:07
L26	4	25 and (load near5 information)	US-PGPUB; USPAT	OR	ON	2011/06/24 10:08

L27	118	11 and (power same load)	US-PGPUB; USPAT	OR	ON	2011/06/24 10:10
L28	28	11 and (power same load same interference same information)	US-PGPUB; USPAT	OR	ON	2011/06/24 10:10

EAST Search History (Interference)

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Docket No. 1004289-386US (4208-4448)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.:	12/203,746	Confirmation No.:	3717
Applicant(s):	Pertti TOLONEN	Group Art Unit:	2618
		Examiner:	S. NGUYEN
Filed:	September 3, 2008		
		Customer No.:	10928
For:	SOFTWARE-DEFINED RADIO CONFIGURATION		

AMENDMENT UNDER 37 C.F.R. §1.111

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Non-Final Office Action (Part of Paper No. 20110803) dated August 15, 2011, reconsideration is respectfully requested in view of the following amendments and remarks. No extension-of-time is believed necessary as this response has been timely filed.

Amendments to the Claims are reflected in the "Listing of Claims" that begins on page 2 of this paper; and

Remarks/Arguments begin on page 11 of this paper.

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method, comprising:

initiating an inquiry from an apparatus to at least one other apparatus;

receiving remote characteristic information into the apparatus, the remote characteristic information ~~corresponding to the at least one other apparatus~~ comprising at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus and user preferences configured in the at least one other apparatus;

determining local characteristic information in the apparatus;

formulating a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

sending the configuration from the apparatus to the at least one other apparatus;

implementing the configuration in the apparatus; and

establishing communication between the apparatus and at least one other apparatus in accordance with the configuration.

2. (Original) The method of claim 1, wherein the inquiry is conducted via an initialization channel that is established in both the apparatus and the at least one other apparatus.

3. (Canceled).

4. (Original) The method of claim 1, wherein local characteristic information comprises at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus, and user preferences configured in the apparatus.

5. (Original) The method of claim 1, wherein the configuration comprises at least information that is required by the apparatus and the at least one other apparatus in order to establish communication via a wireless transport, the wireless transport being determined based on the remote characteristic information and the local characteristic information.

6. (Original) The method of claim 1, wherein the configuration is sent via an initialization channel that is established in both the apparatus and the at least one other apparatus, the at least one other apparatus implementing the configuration that was sent from the apparatus.

7. (Original) The method of claim 1, wherein implementing the configuration comprises discontinuing communication occurring on an initialization channel and resetting resources in the apparatus and the at least one other apparatus in accordance with the configuration.

8. (Original) The method of claim 1, wherein the communication between the apparatus and the at least one other apparatus is established via a wireless transport that is different from the wireless transport utilized to transmit the inquiry from the apparatus.

9. (Currently Amended) A computer program product comprising computer executable program code recorded on a computer readable medium, the computer executable program code comprising:

computer program code configured to initiate an inquiry from an apparatus to at least one other apparatus;

computer program code configured to receive remote characteristic information into the apparatus, the remote characteristic information ~~corresponding to the at least one other apparatus~~ comprising at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other

apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus and user preferences configured in the at least one other apparatus;

computer program code configured to determine local characteristic information in the apparatus;

computer program code configured to formulate a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

computer program code configured to send the configuration from the apparatus to the at least one other apparatus;

computer program code configured to implement the configuration in the apparatus; and

computer program code configured to establish communication between the apparatus and at least one other apparatus in accordance with the configuration.

10. (Original) The computer program product of claim 9, wherein the inquiry is conducted via an initialization channel that is established in both the apparatus and the at least one other apparatus.

11. (Canceled).

12. (Original) The computer program product of claim 9, wherein local characteristic information comprises at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus, and user preferences configured in the apparatus.

13. (Original) The computer program product of claim 9, wherein the configuration comprises at least information that is required by the apparatus and the at least one other apparatus in order to establish communication via a wireless transport, the wireless

transport being determined based on the remote characteristic information and the local characteristic information.

14. (Original) The computer program product of claim 9, wherein the configuration is sent via an initialization channel that is established in both the apparatus and the at least one other apparatus, the at least one other apparatus implementing the configuration that was sent from the apparatus.

15. (Original) The computer program product of claim 9, wherein implementing the configuration comprises discontinuing communication occurring on an initialization channel and resetting resources in the apparatus and the at least one other apparatus in accordance with the configuration.

16. (Original) The computer program product of claim 9, wherein the communication between the apparatus and the at least one other apparatus is established via a wireless transport that is different from the wireless transport utilized to transmit the inquiry from the apparatus.

17. (Currently Amended) An apparatus, comprising:

at least one software-defined radio module; and

a processor, the processor being configured to:

initiate an inquiry from to at least one other apparatus;

receive remote characteristic information, the remote characteristic information ~~corresponding to the at least one other apparatus~~ comprising at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus and user preferences configured in the at least one other apparatus;

determine local characteristic information;

formulate a configuration, the configuration being based on the remote characteristic information and the local characteristic information;

send the configuration to the at least one other apparatus;

implement the configuration; and

establish communication with at least one other apparatus in accordance with the configuration.

18. (Original) The apparatus of claim 17, wherein the inquiry is conducted via an initialization channel that is established in both the apparatus and the at least one other apparatus.

19. (Canceled).

20. (Original) The apparatus of claim 17, wherein local characteristic information comprises at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus, and user preferences configured in the apparatus.

21. (Original) The apparatus of claim 17, wherein the configuration comprises at least information that is required by the apparatus and the at least one other apparatus in order to establish communication via a wireless transport, the wireless transport being determined based on the remote characteristic information and the local characteristic information.

22. (Original) The apparatus of claim 17, wherein the configuration is sent via an initialization channel that is established in both the apparatus and the at least one other apparatus, the at least one other apparatus implementing the configuration that was sent from the apparatus.

23. (Original) The apparatus of claim 17, wherein implementing the configuration comprises discontinuing communication occurring on an initialization channel and resetting resources in the apparatus and the at least one other apparatus in accordance with the configuration.

24. (Original) The apparatus of claim 17, wherein the communication between the apparatus and the at least one other apparatus is established via a wireless transport that is different from the wireless transport utilized to transmit the inquiry from the apparatus.

25. (Currently Amended) An apparatus, comprising:

means for initiating an inquiry from the apparatus to at least one other apparatus;

means for receiving remote characteristic information into the apparatus, the remote characteristic information ~~corresponding to the at least one other apparatus~~ comprising at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus and user preferences configured in the at least one other apparatus;

means for determining local characteristic information in the apparatus;

means for formulating a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

means for sending the configuration from the apparatus to the at least one other apparatus;

means for implementing the configuration in the apparatus; and

means for establishing communication between the apparatus and at least one other apparatus in accordance with the configuration.

26. (Currently Amended) A method, comprising:

receiving wireless communication in an apparatus;

if the wireless communication includes an inquiry requesting characteristic information, determining characteristic information ~~corresponding to the apparatus~~ comprising at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus and user preferences configured in the apparatus;

responding to the inquiry, the response comprising the characteristic information;

receiving further wireless communication in the apparatus, the further wireless communication including a configuration;

implementing the configuration in the apparatus; and

establishing communication in accordance with the configuration.

27. (Currently Amended) A computer program product comprising computer executable program code recorded on a computer readable medium, the computer executable program code comprising:

computer program code configured to receive wireless communication in an apparatus;

computer program code configured to, if the wireless communication includes an inquiry requesting characteristic information, determine characteristic information ~~corresponding to the apparatus~~ comprising at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus and user preferences configured in the apparatus;

computer program code configured to respond to the inquiry, the response comprising the characteristic information;

computer program code configured to receive further wireless communication in the apparatus, the further wireless communication including a configuration;

computer program code configured to implement the configuration in the apparatus; and

computer program code configured to establish communication in accordance with the configuration.

28. (Currently Amended) An apparatus, comprising:

at least one radio module; and

a processor, the processor being configured to:

receive wireless communication in an apparatus;

if the wireless communication includes an inquiry requesting characteristic information, determine characteristic information ~~corresponding to the apparatus~~ comprising at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus and user preferences configured in the apparatus;

respond to the inquiry, the response comprising the characteristic information;

receive further wireless communication in the apparatus, the further wireless communication including a configuration;

implement the configuration in the apparatus; and

establish communication in accordance with the configuration.

29. (Currently Amended) An apparatus, comprising:

means for receiving wireless communication in an apparatus;

means for, if the wireless communication includes an inquiry requesting characteristic information, determining characteristic information ~~corresponding to the apparatus~~ comprising at least one of supported communication transport configuration information for the apparatus, power status information for the apparatus, processing load information for the apparatus, communication load information for the apparatus, proximate interference information for the apparatus and user preferences configured in the apparatus;

means for responding to the inquiry, the response comprising the characteristic information;

means for receiving further wireless communication in the apparatus, the further wireless communication including a configuration;

means for implementing the configuration in the apparatus; and

means for establishing communication in accordance with the configuration.

REMARKS

I. Status of the Claims:

Claims 1-29 were pending in the present application prior to this submission. The Examiner objected to claims 3, 11 and 19 as containing allowable subject matter but depending on rejected base claims, while claims 1, 2, 4-10, 12-18 and 20-29 were rejected in the previous Non-Final Office Action.

Claims 1, 9, 17 and 25-29 have been amended herein. Claims 3, 11 and 19 have been canceled herein without prejudice or disclaimer. No new matter is introduced, and thus entry and consideration of this amendment is respectfully requested.

II. Allowable Subject Matter:

The Examiner has objected to claims 3, 11 and 19 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants respectfully acknowledge that the Examiner has deemed that claims 3, 11 and 19 to contain allowable subject matter, and have proceeded to incorporate subject matter from these claims into independent claims 1, 9, 17 and 25-29. Claims 3, 11 and 19 have been canceled herein without prejudice or disclaimer.

In view of the above, Applicants respectfully request that the claim objections to claims 3, 11 and 19 now be withdrawn.

III. Response to Claim Rejections under 35 U.S.C. §103

Claims 1-2, 4-10, 12-18 and 20-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Abe et al. (US 2008/0200195, hereafter "Abe") in view of Nasu et al. (US 2004/0266404, hereafter "Nasu"). In particular, the Examiner has alleged that the above claims are obvious in view of the combined teachings of the Abe and Nasu references.

Reconsideration of the present application is respectfully requested in view of the claim amendments and remarks presented herein. For example, amended claim 1 now recites:

1. (Currently Amended) A method, comprising:

initiating an inquiry from an apparatus to at least one other apparatus;

receiving remote characteristic information into the apparatus, the remote characteristic information comprising at least one of supported communication transport configuration information for the at least one other apparatus, power status information for the at least one other apparatus, processing load information for the at least one other apparatus, communication load information for the at least one other apparatus, proximate interference information for the at least one other apparatus and user preferences configured in the at least one other apparatus;

determining local characteristic information in the apparatus;

formulating a configuration in the apparatus, the configuration being based on the remote characteristic information and the local characteristic information;

sending the configuration from the apparatus to the at least one other apparatus;

implementing the configuration in the apparatus; and

establishing communication between the apparatus and at least one other apparatus in accordance with the configuration.

The above amended claim 1 incorporates subject matter from claim 3 that the Examiner previously indicated was allowable. Moreover, subject matter from claims 11 and 19 that the Examiner also previously indicated was allowable has been incorporated into claims 9 and 17, respectively. Subject matter substantially similar to that recited in claims 3, 11 and 19 has also been incorporated into claims 25-29. To avoid duplication, claims 3, 11 and 19 have been canceled herein without prejudice or disclaimer.

In view of the above, Applicants respectfully assert that at least amended claims 1, 9, 17 and 25-29 are allowable. The other pending claims not discussed above are also asserted to be allowable for depending from the amended independent claims. Therefore, Applicants respectfully request that the 35 U.S.C. §103(a) rejections to the above claims now be withdrawn.

CONCLUSION

Based on the foregoing amendments and remarks, Applicants respectfully request reconsideration, withdrawal of the claim objections/rejections and allowance of this application.

AUTHORIZATION

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **504827**, Order No. 1004289.386US (4208-4448).

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **504827**, Order No. 1004289.386US (4208-4448).

Respectfully submitted,
LOCKE LORD BISSELL & LIDDELL LLP

Dated: October 6, 2011

By: 

Elliot L. Frank
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Electronic Acknowledgement Receipt

EFS ID:	11123759
Application Number:	12203746
International Application Number:	
Confirmation Number:	3717
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATION
First Named Inventor/Applicant Name:	Pertti TOLONEN
Customer Number:	10928
Filer:	Elliot Lyle Frank/Cheryl Pannell
Filer Authorized By:	Elliot Lyle Frank
Attorney Docket Number:	1004289.386US (4208-4448)
Receipt Date:	06-OCT-2011
Filing Date:	03-SEP-2008
Time Stamp:	12:45:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		4208-4448-1004289-386US-AMDT.pdf	123406 6dbbcac47676a35d766a9556b49bce1bdedc3f02	yes	13

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	10
Applicant Arguments/Remarks Made in an Amendment	11	13

Warnings:	
Information:	
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National Stage of an International Application under 35 U.S.C. 371
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/203,746	Filing Date 09/03/2008	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	10/06/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 26	Minus	** 29	= 0	X $ =		OR	X $60=	0
	Independent (37 CFR 1.16(h))	* 6	Minus	***8	= 0	X $ =		OR	X $250=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/VERONICA AUGBURN/

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NOTICE OF ALLOWANCE AND FEE(S) DUE

10928 7590 11/21/2011

Locke Lord LLP
IP Docket Department
3 World Financial Center
New York, NY 10281-2101

EXAMINER
NGUYEN, SIMON

ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 11/21/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/203,746	09/03/2008	Pertti TOLONEN	1004289.386US (4208-4448)	3717

TITLE OF INVENTION: SOFTWARE-DEFINED RADIO CONFIGURATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	02/21/2012

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/203,746	09/03/2008	Pertti TOLONEN	1004289.386US (4208-4448)	3717

TITLE OF INVENTION: SOFTWARE-DEFINED RADIO CONFIGURATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	02/21/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, SIMON	2618	455-552100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

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1 _____

2 _____

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3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

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❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/203,746	09/03/2008	Pertti TOLONEN	1004289.386US (4208-4448)	3717

10928 7590 11/21/2011

Locke Lord LLP
IP Docket Department
3 World Financial Center
New York, NY 10281-2101

EXAMINER	
NGUYEN, SIMON	

ART UNIT	PAPER NUMBER
2618	

DATE MAILED: 11/21/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 650 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 650 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

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Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	12/203,746	TOLONEN, PERTTI	
	Examiner	Art Unit	
	SIMON NGUYEN	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Amendments filed 10/6/11*.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1,2,4-10,12-18 and 20-29*.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/SIMON D NGUYEN/ Primary Examiner, Art Unit 2618	November 16, 2011

Allowable Subject Matter

1. Claims 1-2, 4-10, 12-18, and 20-29 are allowed.

2. The following is an examiner's statement of reasons for allowance: the prior art of record discloses method and apparatus for establishing communication between a first communication device (apparatus) to a second communication device (other apparatus) in which the first communication device remotely receives information of the second communication device such as power status information, interference information, and user references.

The prior art of record failed to teach or suggest the receiving information further comprising processing load information and communication load information of the second communication device (other apparatus).

Conclusion

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Simon Nguyen whose telephone number is (571) 272-

7894. The examiner can normally be reached on Monday-Friday from 7:00 AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc M. Nguyen can be reached on (571) 272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

November 16, 2011

/SIMON D NGUYEN/

Primary Examiner, Art Unit 2618

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12203746	TOLONEN, PERTTI
	Examiner	Art Unit
	SIMON NGUYEN	2618

SEARCHED

Class	Subclass	Date	Examiner
455	39, 41.2-41.3, 67.11,515-517, 552.1-553.1, 556.1-556.2	8/3/11	SN
370	338, 342, 343.	8/3/11	SN
Updated		11/16/11	SN

SEARCH NOTES

Search Notes	Date	Examiner
EAST	8/3/11	SN
EAST	11/16/11	SN

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
See SEARCH		11/16/11	SN

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
12203746	TOLONEN, PERTTI
Examiner	**Art Unit**
SIMON NGUYEN	2618

ORIGINAL

CLASS	SUBCLASS
455	39

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
455	41.2	67.11	552.1		
370	338				

INTERNATIONAL CLASSIFICATION

CLAIMED	NON-CLAIMED
H 0 4 B 7 / 00 (2006.0)	
H 0 4 B 17 / 00 (2006.0)	
H 0 4 M 1 / 00 (2006.0)	
H 0 4 W 4 / 00 (2009.01.01)	

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	15	17												
2	2	16	18												
	3		19												
3	4	17	20												
4	5	18	21												
5	6	19	22												
6	7	20	23												
7	8	21	24												
8	9	22	25												
9	10	23	26												
	11	24	27												
10	12	25	28												
11	13	26	29												
12	14														
13	15														
14	16														

NONE

(Assistant Examiner) (Date)

Total Claims Allowed: 26

/SIMON NGUYEN/
Primary Examiner.Art Unit 2618 11/16/11

(Primary Examiner) (Date)

O.G. Print Claim(s)	O.G. Print Figure
1	1

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	(power near2 status) same load same interference same communication same information	US-PGPUB; USPAT	OR	ON	2011/11/16 09:27
L2	184	power same load same interference same communication same information	US-PGPUB; USPAT	OR	ON	2011/11/16 09:34
L3	152	2 and (receiv$3 near5 information)	US-PGPUB; USPAT	OR	ON	2011/11/16 09:34
L4	5	3 and inquiry	US-PGPUB; USPAT	OR	ON	2011/11/16 09:35
L5	25	3 and (local near7 information)	US-PGPUB; USPAT	OR	ON	2011/11/16 09:37
L6	13	5 and (establish$3 with (communication or connection))	US-PGPUB; USPAT	OR	ON	2011/11/16 09:38

11/16/2011 9:47:32 AM

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12203746	TOLONEN, PERTTI
	Examiner	**Art Unit**
	SIMON NGUYEN	2618

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	08/04/2011	11/16/2011							
1	1	✓	=							
2	2	✓	=							
	3	O	-							
3	4	✓	=							
4	5	✓	=							
5	6	✓	=							
6	7	✓	=							
7	8	✓	=							
8	9	✓	=							
9	10	✓	=							
	11	O	-							
10	12	✓	=							
11	13	✓	=							
12	14	✓	=							
13	15	✓	=							
14	16	✓	=							
15	17	✓	=							
16	18	✓	=							
	19	O	-							
17	20	✓	=							
18	21	✓	=							
19	22	✓	=							
20	23	✓	=							
21	24	✓	=							
22	25	✓	=							
23	26	✓	=							
24	27	✓	=							
25	28	✓	=							
26	29	✓	=							

To: ptopatentcommunication@lockelord.com,Shopkins@lockelord.com,Jmedina@lockelord.com
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 10928

Nov 21, 2011 05:23:42 AM

Dear PAIR Customer:

Locke Lord LLP
IP Docket Department
3 World Financial Center
New York, NY 10281-2101
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 10928 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
12203746	NOA	11/21/2011	1004289.386US (4208-4448)

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(571) 273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Locke Lord LLP
701 8th Street, N.W., Suite 700
Washington, D.C. 20001

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/203,746	09/03/2008	Pertti TOLONEN	1004289.386US	3717

TITLE OF INVENTION:

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
Nonprovisional	NO	$1740.00	$300.00	$2040.00	02/21/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Locke Lord LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE	(B) RESIDENCE: (CITY and STATE OR COUNTRY)
Nokia Corporation	Espoo, Finland

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

☑ Issue Fee
☑ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _

4b. Payment of Fee(s):

☐ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☑ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 504827 .

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /John E. Hoel/ Date December 13, 2011

Typed or printed name John E. Hoel Registration No. 26279

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/47 (03-09)
Approved for use through 03/31/2012. OMB 0651-0016
U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

"FEE ADDRESS" INDICATION FORM

Address to:
Mail Stop M Correspondence
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

- OR -

Fax to:
571-273-6500

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. **When to check the first box below**: If you have a Customer Number to represent the fee address. **When to check the second box below**: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☑ Customer Number: 00197

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
	12/203,746

Completed by (check one):

☐ Applicant/Inventor

/John E. Hoel/
Signature

☑ Attorney or Agent of record 26,279 (Reg. No.)

John E. Hoel
Typed or printed name

☐ Assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

(202) 220-6900
Requester's telephone number

☐ Assignee recorded at Reel _____ Frame_____

December 13, 2011
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more that one signature is required, see below*.

☑ *** Total of 1 forms are submitted.**

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	12203746
Filing Date:	03-Sep-2008
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATION
First Named Inventor/Applicant Name:	Pertti TOLONEN
Filer:	John E. Hoel/Cheryl Pannell
Attorney Docket Number:	1004289.386US (4208-4448)

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**2040**

Electronic Acknowledgement Receipt

EFS ID:	11601062
Application Number:	12203746
International Application Number:	
Confirmation Number:	3717
Title of Invention:	SOFTWARE-DEFINED RADIO CONFIGURATION
First Named Inventor/Applicant Name:	Pertti TOLONEN
Customer Number:	10928
Filer:	John E. Hoel/Cheryl Pannell
Filer Authorized By:	John E. Hoel
Attorney Docket Number:	1004289.386US (4208-4448)
Receipt Date:	13-DEC-2011
Filing Date:	03-SEP-2008
Time Stamp:	09:18:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2040
RAM confirmation Number	8202
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Authorized User	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	4208-4448ptol85b.pdf	205513 dbb1cb8238a17f22a8c1604d894440b34fa06116	no	2
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	4208-4448FeeIndicationForm.pdf	173320 24d36746c53664d71f59cff9a257c70940a9183b	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31995 302412b9c5e67ac13d3928165920a17c2498bcb8	no	2
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<u>New International Application Filed with the USPTO as a Receiving Office</u>
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/203,746	01/24/2012	8103213	1004289.386US (4208-4448)	3717

10928 7590 01/04/2012

Locke Lord LLP
IP Docket Department
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New York, NY 10281-2101

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 793 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Pertti TOLONEN, Aatelikuja 1A, FINLAND;

To: ptopatentcommunication@lockelord.com,Shopkins@lockelord.com,Jmedina@lockelord.com
From: PAIR_eOfficeAction@uspto.gov
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Subject: Private PAIR Correspondence Notification for Customer Number 10928

Jan 05, 2012 05:26:30 AM

Dear PAIR Customer:

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IP Docket Department
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UNITED STATES

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The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
12203746	ISSUE.NTF	01/04/2012	1004289.386US (4208-4448)

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